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Steel Demands Undiminished

Railroads Place Largest Week's Total of Cars of Year—Automobile Industry Struggles for More Material—Further Advances of Prices General—Ore Market Opens Up 50 Cents with Sales of 2,500,000 Tons

MORE resistance among buyers is being created by the constantly rising prices and prolonged deliveries but the underlying requirements are so large that the iron and steel market is moving forward with undiminished momentum. Notwithstanding production is on a high level, shortages of crude and semifinished steel with the mills are general and remain a factor of strength. At Pittsburgh more than 75,000 tons of skelp alone is being sought.

The scrap market has suffered a sharp reverse and prices in different centers have fallen 50 cents to $1 a ton. Because dealers have been short many thousands of tons, and fundamental conditions are so sound, a suspicion of manipulation has been aroused. In eastern Pennsylvania where shortages are estimated at 75,000 to 100,000 tons, 50,000 tons was sold. Coke values are off 25 cents.

Steel prices this week, however, have again moved upward all around. The leading producer has raised the minimum on plates and shapes to 2.45c, Pittsburgh and on bars to 2.35c, an advance of $2. Its wire subsidiary has put up its schedules $2 to $5 per ton while some independents have moved further ahead. Certain independents have announced new prices $4 and $6 higher on pipe and $5 on tin plate. Cold-rolled steel and cut nails are up $3. Sheets are commonly selling $6 to $8 per ton above the Steel corporation level.

IRON TRADE REVIEW composite of fourteen leading iron and steel products rises abruptly this week to $46.50 compared with $45.33 last week. The index now is the highest since the week of March 2, 1921.

Ore Sales Heavy

Heavy sales have quickly followed the opening of the season's lake ore market the past week at an advance of 50 cents a ton. The moderate proportions of the advance have stimulated confidence among the furnaces to buy freely for future requirements. Open market sales to date are conservatively estimated at 2,500,000 tons with a large tonnage now under negotiation. The new schedule restores the price levels of 1919 and 1921. The opening of the market was brought about by one large Cleveland operator offering its tonnage at the new advanced price.

Railroads Go Ahead

No stepping down of railroad buying is apparent. On the contrary car orders placed the past week were the largest of any week of the present year totaling 23,000. The largest award was 8000 for the Louisville & Nashville. Chicago puts the total of car orders since Jan. 1 at 62,000. Lively buying of track material at advancing prices is shown. One western road is inquiring for 50,000 tons of rails.

The Central railroad of New Jersey is about to ask for 25,000 tons of steel for new tracks across Newark bay with an equal tonnage to follow later.

Plans for pushing automobile production above its present peak level are being made by the builders, with steel supplies and deliveries the chief obstacle. The Ford Motor Co. now on a daily schedule of 6200 cars plans for 6500 cars after April 1. This company broke all records in March for light truck production and April is expected to go far above the present month's figure. The question of steel deliveries is a vexing one for the automobile manufacturers and it has lead to concellations of orders where shipments have been far deferred. In one case 5000 tons of bars was involved.

More stationary conditions have been shown in pig iron the past week. Prices while strong have not kept up the recent advance. Buying for the third quarter has continued in heavy volume with the result that some producers now have obligated most of their capacity for that period.

Germany Is Buyer

Germany has placed nearly 50,000 tons of finished steel with American mills, principally wire and pipe, to fill shortages for export created by the Ruhr situation. Most of this business went to the United States Steel Products Co. About 500,000 tons of coal and coke also has been placed in this country by Germany which wants 250,000 tons of finished steel additional.

Business Trend and Chart Section Page 937

Pig Iron Is More Stationary

General Prices Show Less Advance This Week but Are Strong Because of Heavy Bookings—Buying for Third Quarter Is Brisk—Some Inquiry for Fourth Quarter—More Furnaces Are Resuming

PITTSBURGH, March 27.—The pig iron market as regards price is unchanged from a week ago, $31, valley, still being the prevailing figure on basic, bessemer, malleable and No. 2 foundry. In connection with steelmaking iron, the feature of the market is the closing by Follansbee Bros. Co., with a Pittsburgh blast furnace interest of its inquiry for 10,000 tons at the going market level. As issued, this inquiry calls for the delivery of 2500 tons monthly in June, July, August and September. Last Saturday a prominent machine interest in the Pittsburgh district bought 1000 tons of bessemer at $31, valley, after having purchased a smaller tonnage at $30, valley from a furnace about to go into blast. This leaves the bessemer market quotable at the $31 level. Only one inquiry for bessemer now is out here and on this $31, valley has been quoted. This calls for 500 tons and is in the hands of at least two brokers. Practically no new inquiries for basic now are out. But for the presence of an inquiry for 4000 tons wanted for second quarter by a Pittsburgh district consumer, the malleable market would be without feature. One producer refused to quote on this tonnage which later was doubled, possibly to take in third quarter requirements. The market therefore, is nominal at $31, valley, that being the minimum figure obtainable. Inquiries for No. 2 foundry (1.75 to 2.25 silicon) aggregating approximately 10,000 tons are current for delivery in the third quarter but no producers as yet are willing to quote that far ahead. Several of these indicate that the price may advance to $32 or even $33, valley, for that period but so far they are not definitely naming prices, not knowing what their fuel costs are going to be. Any sales of foundry iron consummated at $32 so far have involved only small amounts such as 50 or 100 tons. The aggregate of third quarter inquiry takes in such amounts as 300 to 3000 tons. The last mentioned tonnage is the largest inquiry now current for delivery during July to September. The Mesta Machine Co. and other large users here are issuing tentative inquiries for foundry iron. One sale of 500 tons of gray forge iron was made at $30.50, valley; high sulphur gray forge is quoted at $30, valley. Sellers of low-phosphorus copper-free iron report further small sales at $35 to $36, valley.

Substantial Tonnage Is Sold

New York, March 27.—Pig iron buying while not as large as a week ago continues of substantial proportions; 20,000 tons having been sold in this district during the past week. A continuance of the heavy buying is indicated by the fact that current inquiries aggregate 20,000 tons. Buying not only continues for second quarter delivery but consumers are covering on an increasing scale for the third quarter. Due to this heavy demand, some furnaces have withdrawn because of being oversold to some extent. Others are picking their business carefully. Prices continue to move upward and in some instances higher is asked for second than for third quarter. The minimum on Buffalo iron now appears to be $30 base furnace for the third quarter while some Buffalo makers now are asking $31 base furnace for second quarter. On eastern Pennsylvania foundry the minimum now is $31 base furnace plus $1 silicon differentials with some makers asking $32 base. Substantial tonnages already have been sold at the $32 base figure. Eastern malleable now is $32 to $33 furnace. Some small lots of copper-bearing low phosphorus iron have been sold at $32 furnace. It is understood that a substantial tonnage in the aggregate of domestic copper-free low phosphorus iron has been sold but no details as to the price are obtainable. The Virginia foundry minimum now is $28.50 base furnace plus 50-cent silicon differentials. Some sales of Virginia foundry iron have been made at $29. base furnace plus $1 differentials. One Virginia maker now is $29.50 base minimum for second quarter plus 50-cent differentials for silicons up to 3.25 per cent and $1 differentials for higher silicons. Central Pennsylvania foundry now is held at all the way from $29 to $31 base furnace.

Statistics of American Production of Finished Steel, Domestic and Export Freight Rates, page 974

Good Selling at Buffalo

Buffalo, March 27.—Buying of pig iron is going along at a steady gait. The $30 base is being quoted for No. 2 plain, (1.75 to 2.25 silicon) for forward delivery. On iron for delivery specified for April one furnace is asking $31 base. Another seller is quoting $31 throughout. Sales sheets show no heavy individual tonnages. One foundry sale of 1600 tons was reported. Sales of 1000 tons are common. Aggregate sales of the week were between 20,000 and 25,000 tons, of which one interest took 17,000 tons. Malleable is being quoted at $30.50.

Large Sales for Third Quarter

Cleveland, March 27.—While pig iron as quoted by the northern Ohio group of makers still in the market show no advances this week, the price situation continues very strong. The majority of buyers have closed for their second quarter tonnages and consequently fewer sales are reported, while buying for the third quarter has been done in greater volume. There is a mixed sentiment concerning the third quarter, and some consumers while making tentative inquiries express their opinion that prices will not advance much over the present level, or will be lower. It develops that three of the furnace interests with headquarters in Cleveland have closed contracts in the last few weeks for a total of more than 200,000 tons of iron of various grades at the same prices that were named by them on iron for the second quarter. A fourth interest has not opened its books. Some large lots are included in the tonnage sold. Inquiry for the third quarter continues heavy, though some sellers closed for lesser tonnages last week than in the week preceding. Small lots continue to be shipped into Cleveland for prompt or second quarter use on a basis of $31, valley, and $27, Birmingham, figuring to around $32.77 to $33.01 delivered. Second quarter business has been well covered. An order for around 5000 tons for a southern Ohio consumer was split, a northern Ohio interest taking one-third of the amount. A southern Ohio interest quoted $31.50, Ironton; the furnace at Hamilton, O., just getting back into operation figured in the quotations. A price of $32, lake furnace, is being quoted on some third quarter inquiries from Michigan, Ohio and Indiana territory. The bulk of the inquiry for third quarter is coming from those states which figured early and heavily in the buying movement for the second quarter. Inquiries in lots from 500 to 1000 tons continue to be made for the second quarter; those from eastern points totaling around 3000 tons. No additional sales of basic are reported.

New Sales Are Lighter

Cincinnati, March 28.—The week just closed was the lightest in volume of sales of pig iron for several weeks. While activity in the market has tapered off to some extent, prices maintain their firmness, because iron is by no means plentiful. Several consumers are in the market with inquiries for third quarter, but as most of these call for northern iron, furnaces will not entertain the business. Southern furnaces are quoting $27 Birmingham base, while the southern Ohio market ranges from $31 to $32, Ironton base. The advance of silvery iron of $1 a ton and the sale of 3000 tons of northern iron to a Detroit manufacturer constituted the high lights in the market during the past week. The Wickham Piano Plate Co., Springfield, O., bought 2000 tons of northern iron for second quarter. This company's original inquiry called for 5000 tons, but owing to the fact that 3000 tons was for delivery during the third quarter, furnaces refused the business. The Hamilton Foundry & Machine Co. closed for 2200 tons of iron, of which 1200 is south-

ern and the remainder northern. Smaller sales of the week ranged from 50 to 200 tons. A sale of several carloads of Virginia iron to a northern Ohio consumer is noted. Inquiries include one from an Indiana melter for 1500 tons of malleable. The Rose-Meehan Foundries Chattanooga, Tenn. is inquiring for 600 tons of malleable bessemer. The Southern railroad is in the market for a small lot of southern iron.

Forward Demands Increasing

St. Louis, March 26.—Demand for third quarter pig iron are appearing in larger volume, and fair sales for that delivery have been made during the past several days. A good demand prevails for prompt iron, with many small melters who delayed filling their needs finding much difficulty in obtaining what they want. Offerings by southern furnaces are growing steadily smaller, and the price continues to advance. Sales were reported at $28, Birmingham, and with one exception, no furnace is selling under $27. The latter interest makes the concession by reason of barge shipment. Northern iron is firm at $32, Chicago, and furnaces in that center are apportioning their iron to customers in this district. The leading local producer has a nominal quotation of of $32 to $32.50, f.o.b. Granite City.

Total sales during the past few days aggregated between 5000 and 6000 tons, the largest single transaction reported being 500 tons to a St. Louis stove builder for second and third quarter.

Southern Well Sold Ahead

Birmingham, Ala., March 26.—Southern furnace interests are sold well ahead into the third quarter and those not out of the market entirely are selling with caution. Small foundries taking from one to three cars of iron at a time are finding difficulty in having their needs met. Quotations are firmly on a $27 basis. Shipments and melting in home territory are at a greater pace than production and the surplus stock is dwindling. The No. 1 furnace of the Alabama Co. at Gadsden lost two days' operations by reason of a coke shortage. The old Oxmoor furnace of the Tennessee Coal, Iron & Railroad Co. will be ready for operation around the first of the coming month. It will be the third week in April before the sixth furnace of the Sloss-Sheffield Steel & Iron Co. will be ready to start up. In case the Sheffield Iron Corp. properties are taken over by a local company, one of the blast furnaces at Sheffield will be immediately repaired and placed in operation. The Woodward and Republic companies each have a blast furnace ready for the torch in this district. Inquiries for pig iron are still numerous, the Middle West being among those apparently in need of a considerable tonnage. Basic iron on yards of the larger consumers in this district is below the 4000-ton mark.

Third Quarter Buying Active

Boston, March 27.—The rush of buying of pig iron for third quarter delivery continues in New England. Prices are advancing and consumers are anxious

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Coke Prices Shade Easier

Furnace Fuel Offered at 25 Cents Less Than Week Ago—Export Demand Falls Off—Third Quarter Inquiry Strong

COKE PRICES, PAGE 916

Pittsburgh, March 27.—Offerings of beehive furnace coke are being made to various interests in this and other districts on the basis of $7.25 to $7.50. One or two additional contracts have been entered into at $7.50 and $7.60, and as high as $7.75 continues to be quoted, although most second quarter requirements have been satisfied. Thus the market is lower than a week ago by 25 cents per ton on the basis of $7.25 to $7.75 instead of $7.50 to $8. This weakness is traced more or less to a falling off in export demands. The Bethlehem Steel Corp. is understood to have closed on a part of its requirement of 15,000 tons monthly for the second quarter and the McKeefrey Iron Co., Leetonia, O., closed on a portion of its requirements at a figure slightly in advance of $7.50. This $7.50 level applied in connection with some other comparatively small lots disposed of recently, such as the 100 carloads bought by a Pittsburgh independent steel interest last week for augmenting its by-product coke supply. The American Radiator Co. is expected to enter the market shortly for coke for the two blast furnaces which it has acquired from the Donner Steel Co., Buffalo. At present the feature of the beehive furnace coke market is the increasing number of inquiries for third quarter tonnages. Pig iron producers are being called upon to quote for third quarter and they are endeavoring to find out what their fuel costs are going to be. So far as can be learned no coke quotations have been made for that period, nor will they be made until after the Easter holiday. While production undoubtedly will be somewhat hampered in the Connellsville region by labor shortages which always occur at the Easter season, no serious difficulty is anticipated. Various sized tonnages are involved in third quarter inquiries, ranging from 5000 to 18,000 tons monthly. Practically all production of standard selected hand-drawn 72-hour foundry fuel has been obligated. Several additional contracts each involving several carloads weekly have been written, and lately the price has been $9, ovens. The market continues quotable at $8.25 to $9. Production, according to the *Connellsville Courier*, for the week ended March 17, was 285,180, as compared with 280,530 tons the preceding week. The total number of ovens active, 23,801 is the largest number since September, 1920.

Furnace Closes for Tonnage

Cincinnati, March 27.—Active demand and steadiness of prices feature the coke market. The movement of furnace fuel is steadily growing. The John A. Savage Co., has closed with a local seller for 15,000 tons a month up until July 1 for its Hamilton, O., furnace. There are a number of sales of furnace and foundry coke, representing a fairly large volume. Two transactions are pending involving large tonnages. Domestic coke is no longer an important factor in this market, and lower prices are anticipated next month. Metallurgical coke is strengthening and indications point to a higher market. Wise county coke is in good demand for spot shipment. Prices remain unchanged.

Coke Shipments Improve

Boston, March 27.—Increased activity among New England foundries has created a strong demand for foundry coke. The freight situation has improved. Prices for by-product fuel are unchanged at $15 to $16, delivered.

Eastern Market Active and Strong

New York, March 27.—Demand for foundry coke is active and the market while unchanged from a week ago is strong. Spot foundry coke is firm at $8.50 to $8.75, Connellsville. Included in the business of the past week have been some sales for second quarter at $8 to $8.25, Connellsville. The market on seaboard and by-product foundry coke continues at $12.84 to $12.91, delivered at Newark and other northern New Jersey points. This maker is not soliciting tonnage but is taking care of its regular trade.

Strong Demand at St. Louis

St. Louis, March 26.—The recent record melting operations at mills and foundries in the district is reflected in a continued strong demand for metallurgical coke. Prices continue strong, and users are urging deliveries on material under contract. Sales of Connellsville coke were reported during the past few days at $9, with a premium of 25 cents for shipments in box cars. The by-product plants continue to ship their entire current output, but are able to handle some new business for foundry coke. Shipments of southern coke are coming through more freely, and the supply situation generally is easier than for several months.

Southern Prices Strong

Birmingham, Ala., March 26.—Stronger coke prices prevail, $8 to $8.50 being the range on the foundry grade, with spot sales in small lots at $9 and higher. The Sloss-Sheffield Steel & Iron Co. with 100,000 tons of coke on its yards at the North Birmingham by-product plant has found it necessary to continue in the market with caution, having sold liberally. It has five furnaces now in blast and a sixth will be started soon. Alabama coke producers could not participate to any great extent in the European business that was offered, and the total shipments abroad will not be large. Local demands are steady and considerable coke is moving to the Middle West. A few spot sales were made during the past week, $10 being the highest price heard of.

The Hopedale Mfg. Co., Milford, Mass, has decided to dispose of its branch plant in Hopedale, Mass known formerly as the Roper shop, and including a brass foundry, and concentrate production in the former town.

Pig Iron More Stationary

(*Concluded from Page* 915)

to be protected at present levels. Nevertheless, competition in this consuming district is strong because of the activity of four eastern producing districts all with approximately the same delivered prices. Birmingham iron with a $27 base reaches Boston by rail and water at $33.91 delivered. For interior points the rates vary up to about $36 delivered. Virginia iron at $28 furnace is $33.92 delivered to practically all points within the district. Eastern Pennsylvania iron at $30 furnace has a $33.65 delivered price. Buffalo iron which until recently has been meeting prices from the other districts is now firm at $30 furnace, which means $34.92 delivered. The strength of the market is shown by the fact that a round tonnage of Buffalo iron was placed. Eastern Pennsylvania furnaces are for the most part well covered ahead and are reluctant to take on much additional tonnage. Virginia interests are at present the most active sellers, and for the higher silicon grades are low in the market. Foreign iron in stock is offered for spot delivery and demand during the past week has been sufficient to move some tonnage at $36 f.o.b. Boston. An eastern Massachusetts manufacturer bought 2000 tons divided between southern and Virginia irons. A Massachusetts textile interest bought several thousand tons of No. 2X 2.25 to 2.75 silicon for third quarter at $34.50 delivered. Other sales ranging from carload to 1000 tons brought the total in excess of 10,000 tons. Inquiry is mostly for small tonnages, but dealers feel that heavy buying for third quarter will continue until well into April. Some inquiry and a few sales for fourth quarter iron are reported.

Basic Tonnage Closed

Philadelphia, March 27.—While pig iron demand is not as large as in recent weeks, steady buying is being maintained and the market is strong by reason of heavy bookings. It is learned at least 25 per cent and probably more of the third quarter output has been sold by the furnaces. Foundry iron now is firm at $31 base, Pennsylvania and New Jersey furnaces plus $1 silicon differentials. Good buying of basic was done the past week. At least 15,000 tons and probably more was closed at prices ranging from $30.25 to $31 delivered eastern Pennsylvania. Probably now it would be possible to buy under $30 furnace. At least 1000 tons of copper-bearing low phosphorus has been sold at $32 furnace. Copper-free low phosphorus has been offered at concessions but none is reported sold.

Chicago Market Strong

Chicago, March 27.—Strength and firmness are the outstanding features of the Chicago pig iron market, the price today being $32, furnace. The second Mayville, Wis., stack is blowing in, leaving only one idle in this district. Production from the added stack is needed to supply the spot demand from melters who bought previously but need more iron. Inquiry is most active for spot requirements and there is some buying to replace southern iron delayed in shipments. Others need more second quarter tonnages than they estimated. Third quarter iron has been sold to cover definite contracts for castings and pig iron for the latter delivery is not being booked freely. One melter in this territory is seeking 1500 to 3000 tons of malleable iron; a northern Illinois user is inquiring for 500 tons of foundry iron, and a Michigan buyer for 300 tons, all for second quarter. The sale of 500 tons of foundry iron to Minnesota for the second quarter is noted. The market for charcoal iron is quiet and prices are unchanged. Jackson county silvery iron has been advanced $1 to $39.50 for 8 per cent.

Manganese Ore Strong

New York, March 27.—Since the sale of washed Caucasian manganese ore, ranging from 53 to 55 per cent, about 10 days ago at 41 cents per unit, c.i.f tidewater, the asking price on this ore has been advanced to 45 cents. Ordinary Caucasian ore now is holding at 42 cents. The market cannot yet be regarded as established at these prices but it is expected that some business now under negotiation will be closed at higher than the recent 41-cent level. Some talk of 45 cents per unit has been heard with reference to Brazilian ore but no prices at which Brazilian ore could be purchased have been developed.

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	March 28, 1923	Feb. 1923	Dec. 1922	Mar. 1922
PIG IRON				
Bessemer, valley, del., Pitts....	$32.77	29.57	30.27	21.21
Basic valley	31.00	26.10	25.00	19.86
*No. 2 foundry, del. Pittsburgh	32.77	28.77	27.37	20.96
*No. 2 foundry, Chicago.....	32.00	29.75	28.00	20.00
Lake Superior charcoal, Chicago	36.15	33.50	35.40	26.90
Malleable, valley	31.00	27.25	26.25	19.00
Malleable, Chicago	32.00	29.75	28.00	20.00
*Southern No. 2, Birmingham..	27.00	24.50	22.65	15.25
*Southern Ohio, No. 2, Ironton	31.00	28.40	27.15	19.00
Basic eastern del., eastern Pa..	30.25	28.15	27.40	19.90
**No. 2X, Virginia furnace....	29.50	27.50	27.75	22.50
**No. 2X, eastern del., Phila..	32.76	30.10	28.45	21.24
Gray forge val., del. Pittsburgh	31.77	27.87	27.12	20.96
Ferromanganese, del. Pitts.....	124.79	112.29	104.92	67.82
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh	45.00	39.25	36.75	29.40
Sheet bars, openhearth, Pitts...	45.00	39.25	36.75	29.40
Billets, bessemer, Pittsburgh...	45.00	38.85	36.75	28.30
Billets, open-hearth, Pittsburgh..	45.00	38.50	36.75	28.30
FINISHED MATERIAL				
Steel bars, Pittsburgh	2.35	2.15	2.00	1.45
Steel bars, Chicago.....	2.40	2.21	2.00	1.56
Steel bars, Philadelphia	2.825	2.525	2.30	1.76

	March 28, 1923	Feb. 1923	Dec. 1922	Mar. 1922
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia	$2.825	2.45	2.25	1.76
Iron bars, Chicago mills.....	2.60	2.46	2.35	1.58
Beams, Pittsburgh	2.45	2.15	1.95	1.45
Beams, Philadelphia	2.825	2.525	2.25	1.76
Beams, Chicago	2.50	2.31	2.10	1.58
Tank plates, Pittsburgh.....	2.45	2.15	1.90	1.45
Tank plates, Philadelphia.....	2.825	2.525	2.25	1.76
Tank plates, Chicago	2.50	2.31	2.10	1.58
Sheets, blk., No. 28, Pittsburgh.	3.85	3.35	3.30	3.00
Sheets, blue anl., No. 10, Pitts.	3.00	2.50	2.50	2.25
Sheets, galv., No. 28, Pittsburgh	5.00	4.35	4.35	4.00
Wire nails, Pittsburgh	2.90	2.75	2.70	2.40
COKE				
Connellsville, furnace, ovens.....	7.25	7.20	6.90	3.25
Connellsville foundry, ovens....	8.25	8.60	7.85	4.05
OLD MATERIAL				
Heavy melting steel, Pittsburgh..	27.50	23.40	20.00	14.95
Heavy melting steel, eastern Pa.	24.50	21.20	16.70	13.15
Heavy melting steel, Chicago....	23.00	19.75	17.00	12.05
No. 1 wrought, eastern Pa.....	27.50	24.10	18.90	15.60
No. 1 wrought, Chicago.....	23.75	20.50	17.25	12.25
Rails for rolling, Chicago.....	25.00	22.00	18.00	12.85

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon

Composite Market Average

Representing the Combined Average Prices per Ton of Fourteen Leading Iron and Steel Products, Yesterday, One Week, One Month, Three Months, One Year and Ten Years Ago

March 28, 1923	March 21, 1923	February, 1923	December, 1922	March, 1922	March, 1913
$46.55	$45.33	$42.61	$40.53	$32.97	$23.60

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

Iron and Steel Prices

SCRAP PRICES, PAGE 980, WAREHOUSE PAGE 972, ORE NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 976

Pig Iron

Bessemer, valley	$31.00
Bessemer, Pittsburgh	32.77
Basic, valley	31.00
Basic, Pittsburgh	32.77
Basic, Buffalo	29.50 to 30.00
Basic, del., eastern Pa.	30.25 to 31.00
Malleable, valley	31.00
Malleable, Pittsburgh	32.77
Malleable, Chicago	32.00
Malleable, Buffalo	30.50
Malleable, del., eastern Pa.	32.00 to 33.50

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.23
No. 2 Southern foundry	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry-Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	34.01 to 34.26
No. 1X, Buffalo	31.50 to 32.50
No. 2 foundry valley	31.00 to 32.00
No. 2 foundry, Pittsburgh	32.77 to 33.77
No. 2 foundry, Buffalo	30.00 to 31.00
No. 2 foundry, Chicago	32.00
No. 2 foundry, Granite City	32.50 to 33.00
No. 2 foundry, Ironton fur.	31.00 to 32.00
No. 2 foundry, Cleveland del.	32.77 to 33.00
No. 2 foundry, del. Phila.	31.76 to 32.13
No. 2 foundry, N. J. tidewater	32.13 to 33.28
No. 2X, eastern del., Phila.	32.76 to 33.13
No. 2X, east. N. J., tidewater	33.13 to 33.78
No. 2X, eastern del. Boston	35.65 to 36.65
No. 2X, foundry, Buffalo fur.	30.50 to 31.50
No. 2X, Buffalo, del. Boston.	35.92 to 36.92
No. 2 southern, Birmingham	27.00
No. 2 southern, Cincinnati	31.05
No. 2 southern, Chicago	33.01
No. 2 southern, Philadelphia	33.80
No. 2 southern, Cleveland	33.01
No. 2 southern, Boston (rail and water)	33.91 to 34.91
No. 2 southern, St. Louis	32.17 to 33.17
No. 2X, Virginia furnace	29.00 to 30.50
No. 2X, Virginia Phila.	34.27 to 35.67
No. 2X, Virginia Jersey City	34.54 to 36.04
No. 2X, Virginia, Boston	35.41 to 36.41
Gray forge, eastern Pa.	30.00 to 31.00
Gray forge, val., del. Pitts.	31.77
Low phos., standard, valley	35.00 to 36.00
Low phos., standard, Phila.	35.00 to 37.00
Low phos., Lebanon furnace	32.00
Charcoal, Birmingham	34.00 to 35.00
Charcoal, Superior, Chicago	36.15

Silvery Iron
Jackson County Ohio, furnace

8 to 9 per cent	$39.50
9 to 10 per cent	41.50
10 to 11 per cent	43.50
11 to 12 per cent	46.50
12 per cent	48.50
13 per cent	51.00

Bessemer Ferrosilicon
Jackson County, Ohio, furnace

10 to 11 per cent	$48.50
11 to 12 per cent	51.80

Ferroalloys

Ferromanganese, 78 to 82 per cent domestic, seaboard	$115.00 to $125.00
Ferromanganese, delivered, Pittsburgh	119.79 to 129.79
†Ferromanganese, 79 per cent, English, c.i.f. seaboard	115.00
Spiegel 19 to 21 per cent furnace	39.00 to 40.00
Ferrosilicon, 50 per cent contract freight allowed	92.50 to 95.00
Ferrotungsten standard, per pound contained	90.00 to 95.00
Ferrochrome, 60 to 70 †Duty paid. chromium, 4 to 6 carbon per pound contained, delivered	12.00
Imported ferrochrome, 4 to 6 per cent carbon	12.00
Ferrovanadium, 30 to 40 per cent per pound estimated, according ton analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producers plant, per net ton	$200.00

Coke

Beehive, Ovens

Connellsville furnace	$7.50 to 8.00
Connellsville foundry	8.25 to 9.00
Pocahontas furnace	nominal
Pocahontas foundry	nominal
New River furnace	9.50 to 10.00
New River foundry	11.50 to 12.50
Wise county furnace	7.25 to 8.00
Wise county foundry	8.50 to 9.50
Alabama furnace	7.00 to 7.50
Alabama foundry	8.00 to 8.50

By-Product

Foundry, Newark, N. J., del.	$12.84 to 12.91
Foundry, Chicago, ovens	15.00
Foundry, Boston, delivered	16.00
Foundry, Granite City, Ill.	14.00
Foundry, Alabama	8.00 to 9.00

Semifinished Material

BILLETS AND BLOOMS
4 x 4-inch base

Open-hearth, Pittsburgh	$42.50 to 47.50
Open-hearth, Youngstown	42.50 to 47.50
Open hearth, Philadelphia	50.17
Bessemer, Pittsburgh	42.50 to 47.50
Bessemer, Youngstown	42.50 to 47.50
Forging, Pittsburgh	55.00
Forging, Philadelphia	55.17 to 60.17

SHEET BARS

Open-hearth, Pittsburgh	$42.50 to 47.50
Open-hearth, Youngstown	42.50 to 47.50
Bessemer, Pittsburgh	42.50 to 47.50
Bessemer, Youngstown	42.50 to 47.50

SLABS

Pittsburgh	$42.50 to 47.50
Youngstown	42.50 to 47.50

WIRE RODS
¼-inch and finer

Wire rods, Pittsburgh	$47.00 to 50.00

SKELP

Grooved skelp, Pittsburgh	2.65c to 3.00c
Universal skelp, Pittsburgh	2.65c to 3.00c
Sheared skelp, Pittsburgh	2.65c to 3.00c

Shapes, Plates and Bars

Structural shapes, Pittsburgh	2.35c to 2.75c
Structural shapes, Phila.	2.675c to 2.975c
Structural shapes, New York	2.69c to 2.99c
Structural shapes, Chicago	2.40c to 2.50c
Tank plates, Pittsburgh	2.35c to 2.75c
Tank plates, Philadelphia	2.675c to 3.075c
Tank plates, New York	2.69c to 3.09c
Tank plates, Chicago	2.50c
Bars, soft steel Pittsburgh	2.35c to 2.75c
Bars, soft steel, Philadelphia	2.575c to 2.825c
Bars, soft steel, New York	2.59c to 2.84c
Bars, soft steel, Chicago	2.30c to 2.40c
Bars, refined iron, Pittsburgh	3.00c to 4.75c
Bars, rail steel, Chicago	2.30c to 2.40c
Reinforcing bars, Pittsburgh	2.45c to 2.50c
Bar iron, common, Phila.	2.825c
Bar iron, common, New York	2.84c
Bar iron, common, Chicago	2.60c

Hoops, Bands, Shafting

Hoops, Pittsburgh, large	3.30c to 3.50c
Hoops, Pittsburgh, small	3.50c to 4.00c
Bands, Pittsburgh	3.30c to 3.50c
Cold finished steel bars, Pittsburgh base	3.00c to 3.10c
Steel shafting	3.00c to 3.10c

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open hearth rails, mill	43.00
Relaying rails, St. Louis	30.00 to 39.00
Relaying rails, Pittsburgh	28.00 to 33.00
Light rails, 25 to 45, mill	2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.15c
Spikes, small railroad, Pitts.	3.75c
Spikes, boat and barge, Pitts.	3.75c
Spikes, railroad, Chicago	3.25c
Track bolts, Pittsburgh	4.50c to 5.50c
Track bolts, Chicago	4.25c
Tie plates, Pittsburgh	2.60c to 2.75c
Tie plates, Chicago	2.60c

Spike, tie plate and track bolt prices for carlots.

Wire Products

To Jobbers in Carloads

Wire nails, Pittsburgh	2.90c to 3.10c
Plain wire, Pittsburgh	2.65c to 2.75c
Annealed wire, Pittsburgh	2.80c to 2.95c
Galvanized wire, No. 9 gage, Pittsburgh	3.25c to 3.35c
Barbed wire, painted, Pitts.	3.35c
Barbed wire, galv., Pittsburgh	3.70c
Polished staples, Pittsburgh	3.35c
Galvanized staples, Pittsburgh	3.80c
Coated nails, count keg, Pitts.	2.60c
Woven wire fencing (retailers)	65 off
Woven wire fencing (jobbers)	67½ off

Chain, Piling, Strip Steel

Chain, 1-in. proof coil, Pitts	6.25c
Sheet piling base, Pittsburgh	2.30c to 2.70c
Hot rolled strip steel, Pittsburgh stamping quality	3.30c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier, base	5.00c to 5.50c

Sheets

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	3.50c to 3.85c
No. 28 bessemer, Pittsburgh	3.50c to 3.85c
No. 28, open-hearth, Phila.	3.825c to 4.175c
No. 28, open-hearth, Chicago	3.84c to 4.34c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	3.50c to 3.85c
No. 28, open-hearth, Chicago	3.84c to 4.34c

GALVANIZED

No. 28, open-hearth, Pitts.	4.60c to 5.25c
No. 28 bessemer, Pittsburgh	4.60c to 5.25c
No. 28, open-hearth, Phila.	4.925c to 5.325c
No. 28, open-hearth, Chicago	4.94c to 5.34c

BLUE ANNEALED

No. 10, open-hearth, Pittsburgh	2.65c to 3.25c
No. 10, bessemer, Pittsburgh	2.65c to 3.25c
No. 10, open-hearth, Phila.	2.975c to 3.575c
No. 10, open-hearth, Chicago	2.99c to 3.34c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.00c to 7.00c

Tin Plate

Per 100 lb. box

Tin plate, coke base, Pitts.	$4.95 to $6.00

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	61 to 64	49½ to 52½
1 to 1½-inch, butt iron	30	14

Boiler Tubes

Carload Discount 4 Points Larger

Steel, 3¼ to 13 inches, 1 c.	45 off
Charcoal iron, 3¼ to 4½ inches l. c.	11 off
Seamless hot rolled, 3¼ to 4-in. l. c.	1.42 off

Cast Iron Water Pipe

Class B Pipe

Four-inch, Chicago	59.20 to 61.20
Six-inch and over, Chicago	55.20 to 57.20
Four-inch, Birmingham	50.00 to 51.00
Six-inch and over, Birmingham	46.00 to 47.00
Four-inch, New York	63.60 to 65.50
Six-inch and over, New York	58.60 to 60.50
Three-inch, Birmingham	56.00 to 57.00

Class A pipe is $3 higher than Class B.
Standard fittings, Birmingham, base, $110.00
6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, $5 higher.

Scrap Losing Strength

Buying Interest Lags and in Some Districts, Especially the East. Prices Are Unsteady—Some Material Still Is Scarce

SCRAP PRICES, PAGE 980

Chicago, March 27.—Steel scrap is somewhat weaker here and a decline of about 50 cents per ton has been registered. There continues a scarcity of melting steel. Specialties are holding the prices attained recently and with a short supply no sign of weakness is apparent. Demand for rolling mill grades is steady and strong. Cast grades are in excellent demand. Railroads are putting out larger lists and continue to receive top prices. The Santa Fe railroad has offered 3500 tons, the Great Northern railroad 2000 tons and the Chicago, Burlington & Quincy railroad 6200 tons. In the latter list 1450 tons of miscellaneous steel rails and 500 tons of number 1 wrought are offered.

Easier Tone Noted

New York, March 27.—Owing chiefly to improved weather conditions, the scrap market the past week has been slightly easier, with heavy melting steel and No. 1 railroad steel off 50 cents. Dealers are offering $20.50 to $21 and $21.75 to $22.25, f.o.b. New York, respectively. Other grades are unchanged, however, and the situation generally may still be regarded as strong.

Market in Sensational Break

Philadelphia, March 27.—A sensational break in the iron and steel scrap market has been noted in this district during the week. Only a few days ago round tonnages of melting steel were purchased by consumers at $27 delivered. Suddenly, however, the feeling of consumers that scrap prices had advanced too high resulted and typical buyers refused to pay higher than $26. Dealers have been in a state of tension for some time trying to figure just how high the market would go and when to sell. Consequently the steel buyers' strike of the past week brought this tension to a climax. Dealers began to sell left and right, with the result consumers in this district yesterday and today bought at least 50,000 tons of melting steel and other grades. Melting steel went mostly at $26 but lower than this figure has been done. Many consumers are out of the market and no steel works is willing to pay as much as $25 for melting steel. The trade generally agrees the break will last a few weeks in view of the open weather permitting larger shipments. There is some discussion as to whether this is the break which usually precedes a general business slump by some months. However, there are no decided views on this point by reason of the fact the general business situation looks so strong, also because increasing exports of steel are expected due to the Ruhr situation. Prices nominally are weak and the level generally is lower.

More Sales Noted at $27.50

Pittsburgh, March 27.—Additional sales of heavy melting steel scrap at $27 to $27.50 have been made here including one lot of approximately 10,000 tons to a Midland, Pa., interest. That spread represents the market, although higher levels have been made in the Youngstown, O., territory. Approximately 8000 to 10,000 tons of rerolling rails have been sold here recently at $29.50 to $30. Small sales of other grades have been noted including railroad malleable, but for the most part consumers are out of the market. A shortage of scrap still prevails. Due to the fact the Brackenridge, Pa., consumer of heavy breakable cast is out of the market, that grade is quoted at 50 cents per ton less this week, or on the basis of $25 to $25.50. It is reported approximately $24.75 was paid for the compressed sheets to be produced by the Westinghouse Electric & Mfg. Co. in April. While a week ago this grade was quoted $26 to $26.50, the spread of the market today is no higher than $25.50 to $26.

The Pennsylvania railroad's scrap lists approximate 40,000 tons including the region's list of 20,815 tons of assorted grades and 14 scrap locomotives with tenders. Bids close April 4.

Strength Still Shown

Buffalo, March 27.—The iron and steel scrap market is as strong as last week. No large sales are reported but several ranging between 500 and 1000 tons involving heavy melting steel have been made. Single carload lots sales are numerous. Both consumers and dealers are in the market for all the material they can obtain but no heavy tonnages are available. Railroad lists which will be out this week, will probably go to other districts than Buffalo. The Buffalo market will scarcely be higher than $26 and Youngstown, O., is $29. All the commodities on the list are active.

Buying Interest Lags

Cleveland, March 27.—Scrap buying interest is lagging in this district. Consumers are not inclined to contract for tonnage at present price levels and as a result the market undertone is week. Prices, however, are unchanged although the belief is growing that a general markdown is not far distant. Another influence in this direction is greater scrap production and heavy stocks in the hands of some users.

Market Tone Is Weaker

Detroit, March 27.—A weaker tone is prevailing in the scrap market among dealers, who report consumers more indifferent to offers. One large consumer who was in the market recently for a liberal tonnage of heavy melting steel and caused a big upturn in the market, has withdrawn. While quotations are steady dealers say they feel a weaker tone. There still is some demand for cast borings and other machine shop turnings, but supplies are apparently sufficient for consumers' needs at present prices.

Situation Is Easier

Cincinnati, March 27.—An easier situation prevails in the local iron and steel scrap market, owing to the lack of interest on the part of consumers. While prices have advanced over last week's quotations, these advances took place the forepart of the week, when there was some small buying. Toward the end of the week the market became listless. Stocks are inadequate. The chief buying during the week centered on the blast furnace grades, although foundry grades were active in spots. Dealers are realizing little scrap from the railroads, although they are disposing of lists with frequency, but not in this market, because they can obtain better prices for their materials in other centers. The Big Four railroad is about to ask for bids on its list.

Strong Market Is Checked

St. Louis, March 26.—The steel scrap market has received a decided check. Prices have eased off, and more material than can be disposed of has appeared. Dealers, who have been holding for higher prices decided to sell at the same time, with the result tonnages have been too heavy to be readily absorbed. The market is more satisfactory from the buyers viewpoint. Southern dealers, notably in Oklahoma, New Orleans, Arkansas and Texas, have suddenly turned loose their accumulations.

Elsewhere, however, the scrap situation remains much the same as earlier in the month. Rolling mill grades, which were the last to revive, have taken on considerable activity. The two leading interests have purchased substantial tonnages, and are in the market for more. The demand for cast grades is brisk with prices higher. The stove plants and job foundries are in need of cast. Generally consumption is heavy.

The railroads are selling more freely. Southern carriers have been marketing their accumulations at top prices. The Great Northern is offering 2000 tons, and the Chicago, Burlington & Quincy is expected to put out a large list this week.

Buying Continues Steady

Birmingham, Ala., March 26.—Old material continues to be bought and sold steadily in the face of an advancing market. Dealers in Ohio have made personal visits to this district again and consumers from other states have been negotiating for scrap here. Specifications offered by large consumers and dealers are so rigid that some hesitancy has been shown here about taking on such business. Buying of scrap by dealers continues steady. Some scarcity in the labor supply is being experienced in the scrap yards.

Youngstown Buys in New England

Boston, March 27.—The strength of the heavy melting steel scrap market is well indicated by recent heavy sales to Youngstown steel makers. Dealers say that it has been years since the market has enabled Youngstown, O., buyers to enter the New England market. One lot of 500 tons for Youngstown sold at $21 shipping point New England. Heavy melting steel for eastern Pennsylvania delivery has sold freely at from $21 to $22. New England consumers of stove plate have been heavy buyers

and the market is strong at $20.50 delivered. Nearly all other grades of scrap have been marked up during the recent trading. Cast grades are scarce and No. 1 machinery can be sold at $28 to $29 delivered. An important Worcester, Mass., consumer has bought breakable cast at $25, but small tonnages less favorably situated command $26 to $26.50.

Higher Levels

Expected To Be Named on Third Quarter Tin Plate

TIN PLATE PRICES, PAGE 916

Pittsburgh, March 27.—Quotations on tin plate continue upward and indicate that higher levels will prevail for the third quarter. The Weirton Steel Co. announced last week its minimum now is $5.25 per base box, 100 pounds, Pittsburgh, instead of $5, an advance of $5 per ton. The American Sheet & Tin Plate Co.'s figure of $4.75 is so far out of line with going market levels that it is entirely nominal. Some independents are quoting $5.50 and a buyer wanting a prompt tonnage or one insisting on a mill connection accepting last half business would probably have to pay a minimum of $6 per box. The last named figure in fact, has applied in connection with the sale of some stock items in relatively small tonnages and it also has applied in connection with some quotations made on foreign business. Practically all current tin plate business is in the form of specifications against contracts, books not yet having been opened for the last half.

Book for Prompt Delivery

Youngstown, O., March 27.—Tin plate for prompt shipment has been booked by a seller in this district but with mills outside the Mahoning valley at $7 per base box, Pittsburgh. Sales of tin mill black also are reported at $4 base. Pittsburgh.

Strip Minimum Raised

STRIP PRICES, PAGE 916

Pittsburgh, March 27.—So far as new business is concerned, the 3.05c and 4.75c prices on hot and cold-rolled strip steel, respectively, are items of the past, being replaced by minimums of 3.30c and 5.00c base Pittsburgh. Strip steel, therefore, can be said to have advanced $5 per ton although for the most part even the new prices are nominal. No 3.30c hot strips are available, makers being sold up. On the basis of raw material costs at present, the next price probably will be 3.50c. At present 3.75c to 4.00c is quoted on narrow sizes and on some particularly undesirable specifications even higher figures prevail. In connection with cold-rolled strips, a limited amount of material is available for second quarter delivery at 5.00c; average specifications would carry a 5.25c figure but up to 5.50c has been quoted on undesirable specifications. Steel is scarce and car and labor supplies are poor; operations are on an 85 to 90 per cent basis despite those handicaps.

The Michigan Drop Forge Co., Pontiac, Mich., reports total sales of products in 1922 to the value of $1,041,099.32, while net profits were $74,032.94.

Sheet Sales Are Held Back

Valley Mills Refuse To Book Tonnages Very Far Ahead—Price Situation Not Clearly Defined—Strong Demand Everywhere

SHEET PRICES, PAGE 916

Pittsburgh, March 27.—Demand for sheets of all kinds, from all consuming lines and in all directions, is growing keener. Practically all commitments have been turned into orders by the furnishing of specifications, and pressure is being brought to bear to hasten deliveries. The American Sheet & Tin Plate Co. reports that approximately 85 per cent of its commitments now are in the form of specifications. Efforts continue to be made from time to time to anticipate coming needs. In a tentative way inquiries for several hundred tons at a time are being made for third quarter requirements but books have not as yet been opened for that period and no prices are named for such deliveries. One buyer wanted 400 tons of blue annealed for delivery in July but was unable to obtain a quotation from makers here.

The leading interest started out the week on a slightly higher operating basis, around 82 per cent while the average of independents is somewhat higher, 85 to 90 per cent. Intermittent buying of American sheets in Japan, South America and other foreign countries is noted from time to time but pressure of domestic customers often precludes the taking of much export business. The prices of the American Sheet & Tin Plate Co., 2.65c, 3.50c, 4.60c and 5.00c, base Pittsburgh, on blue annealed, black, galvanized and full-finished automobile sheets, respectively, are nominal, and far from being representative of the going market levels. Independents are quoting up to 3.25c on blue annealed, as high as 3.85c on black, 5.25c on galvanized, and 7.00c on 22-gage full finished automobile sheets, all base Pittsburgh. Fairly representative market figures are: On blue annealed 3.00c, black 3.75c, galvanized 5.00c, and full-finished 5.35c, base Pittsburgh.

Makers Out of Market

New York, March 27.—Due to the sold-up condition of the sheet mills, practically all of which are out of the market for second quarter because of heavy commitments, it now is difficult to place sheets at lower than 5.00c base Pittsburgh, for galvanized, 3.85c for black and 3.00c for blue annealed. On some business for shipment in four to six weeks higher prices have been done. On galvanized as high as 5.50c, base Pittsburgh, has been quoted. Most of the automobile sheet business which is being booked by independent mills is going at 5.35c, base Pittsburgh, while it is reported that 5.50c has been done for April shipment.

Refuse Sales Beyond April

Youngstown, O., March 27.—Sheet prices in this district are not clearly defined. Reports originating in Detroit are that several large consumers of one-pass black and blue annealed in that district have purchased tonnages of these grades for shipment next month at 2.90c and 3.60c, Pittsburgh, respectively. Shipments leaving the mills here at present represent business taken at 2.75c for blue annealed, 3.60c for black and 4.50c to 4.60c for galvanized. Prices quoted on business for April delivery or for shipment at mill convenience range from 3.00c to 3.25c on blue annealed, 3.85c to 4.00c on black and from 5.25c to 5.50c on galvanized. The latter price ranges represent the market of the only three producers in this territory willing to consider business for delivery over April. All other makers are out of the market, but if any surplus tonnages arise these mills will name a price of 3.00c on blue annealed, 3.75c on black and 5.00c on galvanized, base, Pittsburgh. Producers are not selling sheets beyond April. High officials of sheet consuming concerns are calling in person at several of the mills here trying to line up tonnage. Operation of sheet mills in the Mahoning valley this week is at 99 per cent of capacity. Galvanized sheets are extremely difficult to purchase in this district at any price. Producers which have withdrawn from the galvanized business as makers include the Mahoning Valley Steel Co., the Falcon Steel Co., the Ashtabula Steel Co., the Follansbee Brothers Co., and the Allegheny Steel Co.

Pay Premiums for Sheets

Chicago, March 27.—Steel sheet consumers in the Chicago district who have not been able to cover their needs up to this time find it difficult to place business. Nearly all of them are well covered for second quarter but a few need still further tonnage to meet their requirements. Blue annealed sheets are most difficult to obtain and 2.90c to 3.00c, Pittsburgh, is being asked by mills able to take further business in this grade. On black sheets 4.00c, Pittsburgh, and on galvanized 5.00c, Pittsburgh, and to be the minimum at which business can be placed.

Sell Galvanized At 5.00c

Cleveland, March 27.—One good sized lot of galvanized sheets was placed in this territory by a shipbuilder at 5.00c, Pittsburgh. For black sheets 4.00c has been named, though some mills will do less than this. A local maker is quoting 3.25c, Pittsburgh on No. 28 black.

Demand Is Heavy

Philadelphia, March 27.—Sheet demand continues heavy, both on contract specifications and new demands. Prices on new business continue to advance. It now is difficult to place new orders for blue annealed under 3.00c, base Pittsburgh, while some sales are at 3.25c. The lowest on black sheets is 3.85c, and on galvanized 5.00c. Sheet mills have not taken third quarter business. Second quarter sales have been so heavy much tonnage will go over into the third quarter.

Press for Bar Deliveries

No Relaxation in Demand Despite Sold Up Condition of Mills—Prices Are Firmer as Consumption Appears To Be Growing

BAR PRICES, PAGE 916

Chicago, March 27.—New tonnage and specifications offered steel mills in this territory continue equal to the average for the past three months. New inquiry also is in the same position. Pressure for delivery is increasing and both railroads and industries find their need for steel increasing. Structural operations are expanding with the change in season. The agricultural implement manufacturers are busier than at any time during the past two years and automobile builders are carrying forward the heaviest construction program in history. All these factors increase requirements of manufacturers for soft steel bars and the general manufacturer is also in the market for increased tonnages. Steel bars have been advanced to a minimum of 2.40c, Chicago mill, by an important producer and while 2.30c is quoted by another mill this figure is of no importance, since it has no bars available.

Bar iron is strong at 2.60c, Chicago mill, with demand increasing. At least one producer of bar iron has sufficient business on books to keep it busy three months.

Rail steel bars are more active than they have been for several months and inquiry for several lots of 500 tons each for reinforcing work are being considered. Agricultural implement makers are also taking considerable tonnage of this material. While 2.30c, mill, can be done one producer is quoting 2.40c, mill, but this is largely for the purpose of discouraging buying.

Market Quotations Mean Little

Pittsburgh, March 27.—While some makers of merchant steel bars have a minimum quotation of 2.35c, some recently placed contracts are being worked out at 2.25c, base Pittsburgh. Both of these prices of course mean little in the spot market since up to 2.60c and even 2.75c has been quoted recently with no indication as to when deliveries can be made. In fact, indicative of how some buyers need bars, one interest has just received orders for some small lots from the Pittsburgh district at 2.75c, f.o.b. Johnstown, Pa., the freight rate to Pittsburgh district being 9½ cents. This makes the Pittsburgh equivalent 2.84½c. This same basis, 2.75c Johnstown, applied in connection with sales in Huntington, W. Va., taking a similar freight rate involving up to 1000 tons at a time. The Carnegie Steel Co. is understood now to have a minimum of 2.35c, base Pittsburgh, without any definite promise of delivery. Deliveries in some cases are six to eight months deferred. Consumption continues heavy and relatively little buying is of a speculative character.

3.00c Is Named

Boston, March 27.—Buying of all grades of bars is heavy. One recent order for 1200 tons for soft steel bars was placed at 3.00c, Pittsburgh. Another order of a similar tonnage was placed for third quarter delivery at a price to be determined June 1. Mills are independent toward future business and refuse to name prices. More tonnage for second quarter is, however, being accepted than earlier in the month.

Prices Are $2 Higher

Cleveland, March 27.—Steel bars now are on a minimum basis of 2.35c, Pittsburgh, the Steel corporation mills and leading independents having raised to that figure from 2.25c, Pittsburgh within the week. Where bars are sold in conjunction with shapes for structural purposes, 2.45c, Pittsburgh, the shape price is quoted. Demand for bars shows no relaxation and the mills are more in arrears than ever on their obligations through the constant receipt of heavy specifications from buyers. Consequently they are doing everything they can to avoid making new commitments. Hoops and bands have been advanced to a minimum of 3.05c, Pittsburgh for the heavier sizes with the lighter weights going at 3.60c, and up. Demand for bars and bar mill products from the automobile industry is very pressing.

Premiums Are Offered

New York, March 27.—Due to the sold-up condition of the bar market some consumers are offering substantial premiums for steel bars for early shipment. In some instances buyers have paid 2.75c base Pittsburgh for shipment within two or three weeks. Some bars are selling at 2.60c base Pittsburgh. The usual figure is 2.50c and as a matter of fact not much business from a tonnage standpoint has gone higher. The 2.25c minimum of the leading interest practically has disappeared and this maker as well as the leading independents rarely are quoting anything under 2.35c. The minimum on cold-finished steel now is 3.00c base Pittsburgh. On iron bars the minimum now is 2.50c base Pittsburgh.

Quotations Are Firmer

Philadelphia, March 27.—Steel bar business in this district continues brisk, but it is difficult to obtain bars under 2.50c. Pittsburgh, for reasonable delivery, with nearby business bringing 2.75c. The leading interest and the leading independents minimum of 2.25c to regular customers has practically disappeared and it now is difficult even to place tonnage with regular sources at 2.35c.

Cold-Drawn Advances $4

Pittsburgh, March 27.—An advance of $4 per ton from 2.80c, base Pittsburgh, was inaugurated March 23 and 24 by leading finishers in this district, making the basis 3.00c to 3.10c on carload business. Demand apparently is as heavy as ever, and while 1000-ton lot specifications are rare, some fairly sizable ones have been received in the past week or 10 days. On the basis of 2.35c for merchant steel bars, the 3.00c price leaves $13 for conversion, which it is stated is far from satisfactory on the basis of present production costs. Car supply is far from satisfactory and labor grows more scarce from week to week. Operations are around 85 per cent of capacity on the average although some plants are running full based upon raw material supply.

Quoting Hoops Higher

HOOP PRICES, PAGE 917

Pittsburgh, March 27.—Hoops and bands no longer are obtainable at 3.05c and any business that can be accepted is taken at a minimum of 3.30c, an advance of $5 per ton. On narrow gages 3.50c to 3.75c has been done and up to 4.00c and higher has been quoted on ½-inch material. Hoop and band makers have all the business they can take care of for some time and some are definitely out of the market until books are opened for the third quarter. No definite date is indicated for that action.

Bolt, Nut, Rivet Demand Continues Heavy

NUT AND BOLT PRICES, PAGE 976

New York, March 27.—Due to resent price advances bolt and nut consumers are flooding manufacturers with specifications on low priced first quarter contracts. In addition, a heavy volume of contracting for second quarter is being transacted at present prices so that capacity operations during the second quarter are assured. Because of the large business offered, some producers will enter second quarter contracts only from their regular customers. Rivet business is good, but not as large as that in bolts and nuts. There is considerable dissatisfaction among producers over rivet prices which it is said are not in line with the market on related products.

Contracts Come in Freely

Chicago, March 27.—Contracting for bolts and nuts for second quarter delivery is being done freely. Users recall their experience during first quarter, when those who did not contract for their requirements met some difficulty in placing their business. The recently announced schedule of discounts is holding firmly.

New Business Not Desired

Cleveland, March 27.—Producers of bolts and nuts are not anxious to take on much new business at the quoted prices. Specifications are large and new business on the books of makers is so heavy production into the fourth quarter is assured for some interests. In view of this situation, and the fact steel and other raw material prices are uncertain, as well as labor costs and supply, manufacturers do not feel they are warranted in taking on much additional business at the current quotations, for delivery months from now. Prices are firm and operations are being enlarged wherever possible.

Rivet demand continues heavy and makers are having no difficulty in obtaining the quoted prices. Practically every branch of the consuming trade is anxious for rivets and as a result makers' books are well filled with orders. Some rivet producers are having diffi-

culty in obtaining sufficient supplies of steel, but this situation has not yet reached an acute stage.

Prices Are Firm

Pittsburgh, March 27.—The nut, bolt and rivet market is strong on the basis of the last advance. So much business is available makers find no tendency to shade prices in order to obtain orders. The aggregate of business placed represents a good volume and specifications on contracts are furnished liberally, all jobbers and users being anxious to get material. Some orders for nuts and bolts recently have involved several carloads at a time; single carload orders are fairly frequent. Practically the same thing applies to rivets. Operations are on the basis of 80 to 90 per cent of capacity.

More Ore Imported

ORE PRICES, PAGE 976

Philadelphia, March 27.—In the week ended March 24, 1500 tons of chrome ore was imported at this port from British India and 8989 tons from British South Africa. From England 170 tons of iron ore was received while 11,300 tons came from Algeria and 8000 tons from Spain. Scrap steel, to the extent of 378 tons, was imported from Havana, Cuba.

American Radiator Buys Tonawanda Furnaces

Buffalo, March 27.—Final details are being arranged whereby the two Tonawanda, N. Y. blast furnaces of the Donner Steel Co. will be taken over by the American Radiator Co. Archer A. Landon, vice president of the radiator company has stated that the attorneys for the interested parties are drawing up the papers.

Of the Tonawanda furnaces the A stack was built in 1873 and last rebuilt in 1918. The B stack was constructed in 1895 and 1896. The furnaces were owned by the Tonawanda Iron & Steel Co. which in October 1916 leased them to the Donner Steel Co. with an option of purchase. The latter subsequently was exercised. The furnaces have an annual capacity of 180,000 tons.

The American Radiator Co. is one of the largest buyers of merchant pig iron in the country. It has not unfrequently closed for 75,000 to 100,000 tons of pig iron at a time. It is understood that its purchase of the Tonawanda stacks is to insure it of a continuing supply of pig iron which in the past has not always been possible in flush conditions. The company controls coal properties which will enable them to take care of its coke requirements as a pig iron producer.

Plans Coke Works

Two batteries of modern coke ovens will be built at the Lackawanna plant, of the Bethlehem Steel Co. Each battery will have 60 modern by-product ovens, it is said, which will enable the plant to produce 110,000 tons of coke monthly.

The Timken Roller Bearing Co. reports manufacturing profits of $10,925,159 for 1922. After all charges and taxes the net balance available for dividends was $7,724,629.

Plates Placed at 2.50c

Large Consumers Close in East at Higher Price Level—Chicago Minimum Now 2.50c, Pittsburgh 2.45c—Large Car Tonnage Required

PLATE PRICES, PAGE 916

New York, March 27.—Some of the largest consumers in the country have placed plate orders during the past week at as high as 2.60c, base Pittsburgh. The orders involve one or more carloads for prompt shipment. Good sized inquiries have been put out by oil companies but most of the mills are declining to quote on this business. A large volume of business continues to be offered and the mills are picking their orders carefully. It is difficult to shade 2.50c, base Pittsburgh. One eastern mill on Saturday advanced its price from 2.65c to 2.75c, base Pittsburgh, and has sold at the latter figure. The 2.35c minimum of the leading interest practically has disappeared and it is now difficult to do less than 2.45c on any business.

An award of 10,000 tons of plates for a Brooklyn, N. Y. pipe job has been made to T. A. Gillespie Co., will be supplied by the Carnegie Steel Co. and fabricated by the Riter-Conley Co. for the East Jersey Pipe Co., a Gillespie subsidiary. Five thousand tons of submarine cast iron pipe for the Narrows has been placed by the Merritt, Chapman & Scott Corp. with the United States Cast Iron Pipe & Foundry Co.

Plate Prices Move Up

Chicago, March 27.—Quotations on steel plates are now uniform at 2.50c, Chicago mill, the lower figure of 2.45c, Chicago, which was available a week ago, having disappeared. Both important platemakers at Chicago are now on the same basis, although one has nothing to offer at present. Placing of 11,000 railroad cars during the past week involved about 100,000 tons of steel, of which a large portion is plates. An inquiry for 58 stills for the Sinclair Oil Co. involves 1600 tons of steel, of which all but a small portion is plates. The Chicago Bridge & Iron Co. has taken orders for 24 tanks of 80,000-barrel capacity for the Marland Oil Co., requiring 7200 tons of plates. The Graver Corp. is understood to have taken a further lot of tanks for the same company within the past few days.

Small Tank Inquiries Numerous

Pittsburgh, March 27.—Small inquiries for one or two tanks apiece are plentiful before fabricators in this district. They involve 150 to 300 tons of plates each. Most of the larger oil storage tank work has been awarded and barge, gasholder and boiler work is comparatively light. Difficulty is experienced by fabricators in bidding, owing to the fact that plate mills are out of the market. The market is considered quotable at 2.35c to 2.75c. Some quotations as high as 3.00c recently have been current but these are understood to apply where premiums have been offered by buyers for prompt deliveries.

Pacific Coast Demand Large

Philadelphia, March 27.—No let up of plate demand is shown but a disproportional share of the current business is coming from other than this district. A particularly big demand from the Pacific Coast prevails and also much tonnage is being placed from the West. A notable feature of the market is the extent to which the middle western mills are placing orders with eastern mills for tonnages, they themselves cannot furnish to their regular customers. Such orders have been placed the past week as high as 2.65c base eastern mill. One eastern maker Friday increased to 2.75c base Pittsburgh as a minimum. All other eastern mills since have followed suit but so far this price has not been done to any extent. Most of the business of the past week was at 2.50c Pittsburgh. The 2.35c base Pittsburgh price now has practically disappeared. The minimum in most cases with the leading interest and large independents, is 2.45c Pittsburgh but only requirements of regular customers are being taken at this level. Considerable business the past week went at 2.65c Pittsburgh. The leading business in this district the past week involved 500 to 1000 tons of repair plates for the railroads. Other business in this district was principally in small lots.

Quotations Readily Accepted

Cleveland, March 27.—While there is more talk that buyers are showing greater resistance to further price advances plate sellers report practically all quotations are being snapped up particularly where assured delivery can be promised. Eastern mills now quoting six weeks shipment are selling at 2.80c to 3.00c, mill for eastern delivery. The leading producer now is quoting 2.45c, Pittsburgh, having advanced $2 per ton in the week, and is taking business on the new basis. Large independent mills have taken similar action. Deliveries on plates with shipment from the larger mills now run into the fourth quarter and this is practically a guess, so large are the obligations.

Plate Standards Revised

Some revisions in the standard manufacturing specifications for structural and boiler steel recently have been adopted by the Association of American Steel Manufacturers. The tensile strength requirements for fire-box steel in pounds per square inch now runs from 52,000 to 62,000 as compared with 52,000 to 60,000 previously. The permissible variations in weight and thickness of sheared plates now have been made to apply only to rectangular plates where heretofore circular and sketch plates were covered. The word "rectangular" has been inserted in the caption covering the permissible variations. This now reads "Permissible Variations in Weight and Thickness of Rectangular Sheared Plates" as against "Permissible Variations in Weight and Thickness of Sheared Plates," previously.

Net profits of the Kelsey Wheel Co., were $1,801,512 against $1,792,861. President John Kelsey says that present "indications point to a very favorable and profitable business for 1923."

Small Steel Lots Higher

Sheet Bars Sold Up to $50—Little Tonnage Still Available at $45 Price—Some Wire Rods Closed at $70

SEMIFINISHED STEEL PRICES, PAGE 916

Pittsburgh, March 27.—The growing scarcity of semifinished materials is sending prices higher. One Ohio steelmaker is reported to have taken on an additional small tonnage of sheet bars for shipment into this vicinity at $50, furnace, and it is doubted if any more tonnage can be placed at the $45 figure. Even the quotation of $47.50 is nominal in the absence of mills' ability to take on business at any figure. The quotable market on sheet bars, billets and slabs is $42.50 to $47.50, Pittsburgh or Youngstown, with the understanding that the $42.50 price applies only to unfilled portions of contracts for the second quarter. One or two makers of blue annealed sheets have sounded out the slab market but are unable to find anybody in a position to accept additional business. The same holds true largely of sheet bars and billets. Two fair sized lots of forging billets, approximately 200 or 300 tons at a time, have brought $55, Pittsburgh. Nothing below that level now is available, the $50 quotation having disappeared.

In connection with skelp, quotations of 2.50c have been lost sight of and 2.65c Pittsburgh, largely is nominal; 2.75c and even 3.00c being quoted. In excess of 75,000 tons of skelp is under inquiry in this district, which tonnage includes the National Tube Co.'s requirements of any part of 50,000 tons, which so far as reported has not yet been placed.

A Youngstown, O. interest has just sold a carload of wire rods at $70. The buyer reports quotations as high as $85, Pittsburgh. The quotable market on the base size is no less than $50, the recent quotations of the American Steel & Wire Co. of $47 and $49.50 being entirely nominal. Inquiries for wire rods would be numerous but for the fact that prospective buyers have tried so often to place business without success that they now have slackened their efforts.

Tonnages Very Scarce

Youngstown, O., March 27.—No semifinished overflow is likely while finishing mill operation throughout this district continues at the current rate. Meanwhile tonnages of billets, slabs and sheet bars are impossible to obtain. Customers of long standing have negotiated for their tonnages at $42.50, Youngstown, and higher, some confining their purchases to April delivery and some purchasing their requirements for the second quarter. Export inquiry involves fairly large tonnages of billets and skelp but no quotations are being submitted by producers here owing to present obligations. If sheet bars were available in this district $45, Youngstown, would be the minimum of the market.

Demand Unsatisfied

Cleveland, March 27.—Considerable demand for sheet bars, billets and slabs still remains unsatisfied with the leading producer in this district fully committed for the second quarter. The inquiry for 10,000 tons of sheet bars issued a week by a northern Ohio consumer still is pending, and a number of inquiries are noted for billets and slabs, the price of which is very strong at $45, valley. No tonnage has been definitely closed for the third quarter, though there is much interest on the part of buyers for that period. Wire rods have been booked for export on a basis of $70, Pittsburgh.

Billet Prices Higher

Philadelphia, March 27.—Semifinished prices are advancing. Sales of several thousand tons of billets were made the past week and $45 base Pittsburgh, now is the minimum for rerolling. A price of $50, base Pittsburgh, now is exceptional for forging billets. The latter are averaging $52.50 with $55 asked in some cases.

Premium Prices

Are Paid for Early Ferromanganese—Spiegeleisen Also Remains Scarce

New York, March 27.—Due to the scarcity of ferromanganese for early shipment sales continue to be made of premiums. Several lots have been sold during the past week from $120 to $125 duty paid tidewater. Some of the metal is for shipment out of stock, and some for shipment from England during the second quarter. English ferromanganese for shipment in September and later continues $115 duty paid tidewater.

Owing to the scarcity of nearby spiegeleisen, at least one carload has been sold at $45 duty paid tidewater for spot shipment. On a couple of remaning carloads $50 is asked. The market on third quarter and last half is $39 to $40 furnace for 20 per cent metal and contracts have been made at this level.

Sales of 50 per cent ferrosilicon were made the past week at $92.50, delivered, the minimum carlot price. Leading makers are largely contracted through the remainder of the year. Several hundred tons of tungsten ore sold at about $8 a short ton unit and offerings at that price have gotten scarce. High grade ore now is quoted $8.25 to $8.50 a unit; average ore, $8 to $8.25 a unit. A sale of 1000 tons of Indian chrome ore for May shipment was made at $20, c.i.f. Atlantic port. Ferrochrome prices are unchanged at 12 cents a pound contained for the 4 to 6 per cent carbon grade; one seller of the low carbon grades has advanced its price on 1 to 2 per cent carbon to 35 cents. March is the largest month in point of ferrovanadium sales since the war. Prices are strong at $3.50 and up for the open-hearth grade; $3.75 and up for the tool steel, low-silicon grade.

Pittsburgh Market Quiet

Pittsburgh, March 27.—Except for a few sales of ferromanganese, some for delivery in the first half and others in the last half, the market is without feature. These sales aggregate several hundred tons and a few hundred still is under inquiry. One nearby user is negotiating for 200 tons. The English price of $115, seaboard base, duty paid, for the last is being duplicated by domestic producers; $120 applies to anything for delivery in the first half, while on spot the price is $125.

Spiegeleisen is scarce. One large producer has no material available for delivery in the third quarter if a certain option on a large tonnage is exercised. On an inquiry for 500 tons put out last week it was unable to quote. A portion of this maker's output for the fourth quarter already is obligated. Prices are unchanged at $39 and $40 for 19 to 21 per cent and $38 to $39 for 16 to 19 per cent.

On one inquiry here for 50 per cent ferrosilicon $95, freight allowed, was quoted; on another a price f.o.b. Niagara Falls was named, or about $97 delivered to point of consumption. In other districts intermittent activity in ferrotungsten is noted with prices around 95c quoted on prime material. Ferrovanadium and other alloys are inactive.

Wire Sellers

Continue Out of Market—Prices Are Advanced—Demand Heavy

WIRE PRICES, PAGE 916

Pittsburgh, March 27.—Several wire sellers continue out of the market, a position taken March 12 by the Pittsburgh Steel Co. This interest has advanced woven wire fencing by reducing the discount 1½ points to 65 off to retailers; the jobber discount is 2½ points larger. This increase in price on fencing was inaugurated last week by the American Steel & Wire Co., and other independent fence producers no doubt will fall in line. The American company at the same time advanced its quotation on nails $2 per ton to a base of 2.90c, Pittsburgh, per keg, the level of other independent producers except the Cambria Steel Co. and the Youngstown Sheet & Tube Co. The Cambria company last Saturday raised its nail price from 3.00c to 3.10c, Pittsburgh. The Youngstown Sheet & Tube Co.'s price on nails still is 3.00c. The Cambria company's wire price, however, still is 2.75c with a 20c extra for annealing. Independents generally are quoting 2.65c on wire with 15c extra for annealing, the Youngstown Sheet & Tube Co.'s price being 2.75c, but it is out of the market. Galvanizing No. 9 gage wire carries a 60 cents extra, making the common quotation 3.25c. Cement coated nail deliveries are at least three or four months deferred; the price is unchanged at 2.60c. The American Steel & Wire Co. likewise raised its price on barbed wire and staples $5 per ton to levels quoted for some time past by independents, barbed wire painted being 3.35c; barbed wire galvanized being 3.70c; polished staples, 3.35c, and galvanized staples 3.80c, base Pittsburgh.

Market Minimum Advanced

New York, March 27.—The leading interest has advanced its prices on wire and nails to the figures quoted by leading independents. The market minimum, therefore, now is 2.90c, base Pittsburgh, on nails and 2.65c, base

Pittsburgh on plain wire. Due to their sold up condition the wire mills all are out of the market as far as new business is concerned, except for requirements of their regular customers.

Nail Prices Moved Up

Chicago, March 27.—An advance of $2 per ton on nails to a level of 2.90c, Pittsburgh, and of $5 per ton on barbed wire and staples has gone into effect on the part of the largest producer. This brings painted barbed wire to 3.35c, Pittsburgh and galvanized to 3.70c, Pittsburgh. Polished staples are advanced to 3.35c and galvanized to 3.80c, Pittsburgh. Inquiry for wire and nails continues less than during the early weeks of the year, but demand for early shipment is insistent. The slackening of new business probably is due to slow delivery on contracts already made.

Cut Nails Up $3

Pittsburgh, March 27.—Last week cut nails again were advanced $3 per ton this being the second advance during the month, one of $2 per ton having been inaugurated about March 15. This raises the price on carload lots from $3.25 to $3.40 per 100-pound keg, f.o.b. mill. The price on less-than-carload lots now is $3.65, a difference of 25 cents a keg instead of the usual 10 cents per keg, the former price being $3.35 which involves an advance of $6 per ton on less-than-carload quantities.

Warehouse Prices Hold; Advance Expected

WAREHOUSE PRICES, PAGE 972

New York, March 27.—While advances are expected to materialize in the local warehouse market effective around April 1, no announcement has as yet been made. The revision will affect at least two or three lines, and in all probability affect more. Demand continues heavy, with shapes, plates and steel bars particularly active.

Heavy Demand Reported

Cleveland, March 27.—Local jobbers in iron and steel products report demand continues strong. While prices are holding at the recently established levels, higher quotations are not unlikely in the near future, in view of the constantly increasing mill quotations. Stocks are none too heavy and the leading interest reports it has been forced to decline considerable business due to limited stocks.

Steadier Demand Noted

Detroit, March 27.—Demand for warehouse steel at this point is steadier although buying continues on a broad, active basis. Dealers stocks are fairly large. Moving of sheets of all kinds out of warehouses continues fairly brisk. Galvanized sheet demand is especially strong at current prices. Bolts and rivets likewise are in good demand. No change in warehouse quotations is noted.

The annual report of the Advance Rumely Co., Laporte, Ind., for 1922, shows net profits of $137,610 against a net loss of $1,964,216 in 1921.

The Nonferrous Metals

Break in Prices at London Bothers Market Here—Tin Drops and Zinc Easy—Buyers Quiet

	Copper: Electro delivered	Copper: Lake delivered	Spot Straits New York	†Lead New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
March 21...	17.37½	17.50	48.62½	8.30	8.00	26.00	8.62½	29.00
March 22...	17.37½	17.50	49.25	8.30	8.00	26.00	8.62½	29.00
March 23...	17.37½	17.50	49.50	8.30	8.00	26.00	8.62½	29.00
March 26...	17.37½	17.50	47.75	8.30	7.92½	26.00	8.62½	29.00
March 27...	17.37½	17.50	47.00	8.30	7.85	26.00	8.62½	29.00

†Outside market quotation.

NEW YORK, March 27.—Interruption in the upward trends of metal prices here was caused March 26 by a sharp reaction in London, ranging from £6 to £7 in tin, and £1 in refined copper, to 10s and 12s 6d in lead and zinc. Today London copper, tin and zinc are down again.

Uncertainty as to what action the federal reserve board might take in respect to the reserve bank rediscount rate, at its meeting in Washington, Monday, led to some unsettlement in London. The situation fundamentally has shown no change. Consumption of practically all metals continues at an unprecedented peacetime rate. Producers of copper, lead and zinc are sold up from 30 to 90 days ahead and, due to labor supplies, higher prices are stimulating production only gradually.

Electrolytic copper sold freely in the past week at 17.37½c, delivered, for second quarter; 17.50c for third quarter. These are the lowest current quotations being made by producers. Some outside lots have sold a little under these figures since the drop in London. Casting copper sold at 16.75c refinery. Lake advanced to 17.50c, delivered. The copper situation continues extremely strong. Only one or two sellers have any stocks and all but one refinery are shipping metal hot from the mold. Fabricated products recently were advanced ½ cent on copper, ⅜ on brass, ½ on seamless tubing and ½ on wire.

Zinc quotations reacted about 10 points March 26, after holding steadily at 8c East St. Louis for a week. The lower London market, enabling arbitrage business, between New York and London, was a factor. In other words, metal previously contracted for export shipment was bought back, due to lower London prices. This automatically increases the supply available for domestic sale. Recently 4000 to 5000 tons of German zinc sold in London.

Lead has been quiet and rather easy, at 8.20c, East St. Louis, 8.25c to 8.30c, New York, in the outside market. The leading interest has maintained 8.25c, New York. Consumption is at a high rate, but consumers have been holding off.

Tin quotations have reacted sharply here and abroad. The London spot Straits price was down £20 from the high point of £241 15s reached just two weeks previously. Prices here were down in the same period about 4 cents. Quotations for spot Straits the past week have ranged between 47.00c and 49.00c. Domestic consumers have been holding off, lacking confidence in the market.

Further sales of antimony for importation from London were made this week at 6c, c.i.f. The spot price has been unchanged at 8.62½c to 8.75c, duty paid.

Aluminum ingot prices have been extremely strong, and metal has been scarcer than ever. Sales of 98 to 99 per cent are reported up to 26c, New York; 99 per cent up to 27c New York and Detroit. The Aluminum Co. of America continues to quote 25c on 98 to 99 per cent and 26c on 99 per cent, but is not promising deliveries before July.

Sheet zinc mills are all quoting 10c, base, f.o.b. mill.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
Copper, hot rolled 24 oz., min.	25.25
High brass	21.50
Zinc, ga. 9 to 18 (plates ½c less)	10.00
Lead, full sheets (cut ¼c more)	11.50
Aluminum, base 18 ga. and up	35.40
SEAMLESS TUBES	
Hi brass	28.50
Copper	28.00
RODS	
High brass, round, ¾ to 2½ inch	19.75
Naval brass rod	22.00
WIRE	
Copper	19.37½
High brass	22.00

Old Metals

Dealers' buying prices cents per pound

Cleveland	12.00
Cleveland	11.50 to 12.00
New York	11.25 to 11.75
Chicago	12.25
HEAVY YELLOW BRASS	
New York	8.25
Chicago	9.25
Cleveland	9.00 to 9.50
ZINC	
New York	4.25 to 4.75
Cleveland	4.50
HEAVY COPPER AND WIRE	
Cleveland	14.50
New York	13.25 to 13.75
Chicago	14.25
RED BRASS TURNINGS	
New York	10.25 to 10.75
Cleveland	10.50 to 11.00
Chicago	11.00
YELLOW BRASS TUBING	
Cleveland	9.00 to 9.50
NO. 1 BRASS ROD TURNINGS	
Cleveland	8.50
New York	8.00 to 8.50
Chicago	8.75
ALUMINUM BORINGS	
Cleveland	14.00

Shape Demands Heavier

New York School Construction Planned for 80,000 Tons—Central of New Jersey To Place 50,000 Tons—Mill Prices Higher

STRUCTURAL SHAPE PRICES, PAGE 916

New York, March 27.—With all legal complications cleared away the Central railroad of New Jersey is expected to enter the market shortly for 25,000 tons of structural steel for a double track across Newark bay. Upon the completion of this work the present wooden structure will be torn down and two more tracks involving an additional 25,000 tons will be placed under construction. While there have been relatively few sizable awards in this district during the past week, structural business continues heavy, with deliveries steadily advancing. It would prove difficult for a builder to get anything in the way of sizable tonnage, under four months, and in the majority of cases, would probably find deliveries further extended. A feature of the present demand in New York is the heavy volume of school work contemplated. The schedule for this year calls for 80,000 tons of such building, which is being brought out just as rapidly as plans can be completed. The minimum on shapes for anything like reasonable delivery continues at 2.50c, Pittsburgh.

Heavy Tonnage At Boston

Boston, March 27.—Despite the tightness in structural steel at eastern mills, an exceptionally heavy tonnage is appearing in the Boston market. Contracts let during the week total over 8000 tons, and nearly twice this tonnage is scheduled to be closed during the coming week. The largest jobs are 3300 tons for a $3,000,000 power project at South Weymouth, Mass., and 2200 tons for the Chatham apartment building in Brookline, Mass. Relatively small jobs, from 50 to 200 tons, have appeared in large numbers. One fabricator reports having estimated during the week on 12 jobs running between 100 and 150 tons each. Delivery of structural steel from mills is difficult to secure. Prices are high and uncertain. Orders have been placed all the way from 2.50c to 3.00c, base Pittsburgh. The Phoenix Iron Co. has taken several orders at 2.70c.

Nearby Jobs All Small

Pittsburgh, March 27.—While structural shape projects in the immediate vicinity of Pittsburgh continue to call for relatively small tonnages, awards involving larger amounts are coming to fabricators here from more distant points. McClintic-Marshall Co., this past week received an order for approximately 2000 tons for a building at Detroit for the Paige-Detroit Motor Car Co., and the Jones & Laughlin Steel Corp., received two lots, 650 and 700 tons, respectively, for a hotel at Morgantown, W. Va., and a power house addition at Erie, Pa. The American Bridge Co., and other fabricators all have received a share of the many small jobs being placed from week to week. Fabricators are able to file proposals only with great difficulty because mills are not openly quoting since deliveries are so much deferred. The full spread of the market is 2.35c to 2.75c, although as high as 3.00c, base Pittsburgh, has been named in the way of a premium price for prompt delivery.

Shape Prices Advance Again

Chicago, March 27.—An advance of $1 per ton on plain structural material has just gone into effect, the market now ranging from 2.40c to 2.50c, Chicago mill, but inasmuch as the mill quoting the minimum is unable to take further business at present the 2.50c applies on such business as is being booked. Building operations in the West continue heavy and practically all fabricators have large tonnages already on their books. Additions to the Fair store building at Chicago, requiring 6300 tons, has just been placed. This work has some special features, as construction must be carried on while business continues in the store. An illustration of the difficulty of placing large business is found in the Straus building at Chicago. The steel for this structure was booked by Inland Steel Co. nearly a year ago. No less than six fabricators will prepare the steel for this structure, the owner buying the steel, furnishing drawings, paying freight from mill to fabricating shop and back to Chicago and $39 per ton for fabrication.

Prices Again Are Advanced

Cleveland, March 27.—Structural shape prices show a firmer trend with the leading interest quoting 2.45c, base Pittsburgh, as compared with the 2.35c, base Pittsburgh, quotation of last week. Best deliveries are now in the fourth quarter with few companies considering deliveries of less than five or six months. Eastern mills capable of promising quicker deliveries are quoting 3.00c, base mill. Bethlehem Steel Corp. which has been out of the market in this district for some weeks is now offering Bethlehem sections at 2.50c, base mill. Structural lettings were light, with no large onnages being placed.

Demand from West Is Heavy

Philadelphia, March 27.—Structural shape business continues to come into the Eastern mills in a larger volume than they can book. While there is considerable demand in this district for structural shapes, it is not keeping pace with the Western demand, particularly that on the Pacific coast. There is a constant stream of tonnage coming out for the earliest possible shipment to Western points. While large amounts of structural work have been bid in this district, lettings have been small. Several projects have been abandoned because of high costs and several jobs are being redesigned for greater economy. Quotations for the past week have been at 2.35c, base Pittsburgh, for regular customers but it is exceptionally difficult now to do under 2.45c, base Pittsburgh. Smaller Eastern makers are quoting 2.75c base mill minimum, but have sold some tonnage at 3.00c base mill.

STRUCTURAL CONTRACTS PLACED

Building awards this week	48,634 tons
Building awards last week.....	17,036 tons
Building awards two weeks ago....	24,507 tons

9000 tons, Straus building, Chicago, to Inland Steel Co. for plain material; grillage fabricated by Lakeside Bridge Works, Milwaukee, slabs by Hansell-Elcock, Chicago, columns and floor beams, for lower stories by Vanderkloot Steel Works and Morava Construction Co., Chicago, for upper stories to Kansas City Structural Steel Co. and Minneapolis Steel & Machinery Co.

6300 tons, additions to the Fair store, Chicago, to American Bridge Co.

3900 tons, third addition to the Lenox avenue shops of the Transit commission, New York, formally let to McClintic-Marshall Co.

3300 tons, plant for Edison Electric Co. at South Weymouth, Mass., to independent fabricator.

2400 tons, grain galleries for Baltimore & Ohio railroad, to American Bridge Co.

2000 tons, building for Paige-Detroit Motor Car Co., Detroit, to McClintic-Marshall Co.

2000 tons, office building for Metal & Thermit Corp., New York; bids asked.

2000 tons, building for American Type Foundries Co., Elizabeth, N. J., to McClintic-Marshall Co.

1300 tons, bridge for Maine Central railroad, Topston, Me., reported awarded to Shoemaker Bridge Co.

1000 tons, school No. 72, New York, to Hedden Iron Construction Co.

1000 tons, apartment building at Forty-sixth street and Lexington avenue, New York, to unnamed fabricator.

1000 tons, building for Kaumagraph Co., New York, to Levering & Garrigues Co.

989 tons, Topeka Hotel Co., Topeka, Kans., to Capitol Iron Works.

900 tons, bridge for Baltimore & Ohio railroad, to Fort Pitt Bridge Works.

800 tons, school No. 190, Brooklyn, reported placed.

800 tons, apartment building at 54 East Sixty-seventh street, New York, to Hinkle Iron Co.

800 tons, Leftcourt building, Thirty-seventh street, New York, to Paterson Bridge Works.

750 tons, office building, Portland, Me., fabricator not announced.

750 tons, seminary at Rimouski, Que., to Eastern Canada Steel & Iron Works.

740 tons, International Harvester Co., Wisconsin Steel Co. plant, stripper building and soaking pit building, South Chicago, Ill., to Worden-Allen Co.

600 tons, power house addition at Erie, Pa., to Jones & Laughlin Steel Corp.

600 tons, Homer Laughlin China Co., Newell, W. Va., to Ft. Pitt Bridge Works.

600 tons, Greenbaum loft building, Thirty-eighth street, New York, to Lehigh Structural Steel Co., reported last week as fabricator unknown.

600 tons, building for Ginn & Co., Cambridge, Mass., fabricator not announced.

500 tons, Morgantown hotel, Morgantown, W. Va., to Jones & Laughlin Steel Corp.

400 tons, New Haven Gas Light Co., to unknown fabricator.

400 tons, sawmill at Eastport, Fla., for Brooks, Scanlan Lumber Co., to Worden-Allen Co.

350 tons, apartment building at Forty-ninth street and Lexington avenue, New York, to Hay Foundry & Iron Works.

350 tons, loft building at 10 East Forty-ninth street, New York, to Levering & Garrigues Co.

350 tons, building at 952 Fifth avenue, New York, to Harris Structural Steel Co.

350 tons, poles for Pennsylvania railroad, to Belmont Iron Works.

350 tons, building for Megargee Paper Co., Tullytown, Pa., to Belmont Iron Works.

350 tons, seven turntables for Rock Island railroad, to American Bridge Co.

350 tons, union labor temple, Louisville, Ky., to Riverside Bridge Co.

325 tons, four 100-foot turntables—repairs to two additional tables and wheels, boxes and end latches for Great Northern railroad, to American Bridge Co.

300 tons, high school at Cortland, N. Y., to American Bridge Co.

250 tons, paper mill, New Orleans district, to Virginia Bridge & Iron Works.

225 tons, steel foundry for Standard Steel Works, Burnham, Pa., to McClintic-Marshall Co.

200 tons, buildings for General Electric Co., Everett, Mass., to unknown fabricator.

175 tons, plate girder span for International Great Northern railroad, to Wisconsin Bridge & Iron Co.

170 tons, Milbare Dairy Co., San Francisco, to California Steel Co.

150 tons, sugar warehouse in Honolulu, to California Steel Co.

150 tons, Chadham street station for Edison

Light & Power Co., Boston, to independent fabricator.
150 tons, Biron, Wisconsin division, Consolidated Water Power & Paper Co., Biron, Wis.
100 tons, telephone exchange building, Montclair, N. J., to Eidletz & Ross.
100 tons, Childs restaurant, Forty-second street, New York, to Hay Foundry & Iron Works.
100 tons, University of California Masonic club, San Francisco, to Central Iron Works.

STRUCTURAL CONTRACTS PENDING

8000 tons, Flushing subway extension, New York, withdrawn, pending revision of plans.
4000 tons, power station at Weymouth, Mass.; pending, formerly pending as 2000 tons.
3500 tons, bridges for the Chesapeake & Ohio railroad of which 2000 tons is at Clifton Forge, Va.; pending.
3000 to 4000 tons, Kugler Hotel, Philadelphia; plans now being drawn.
2800 tons, Pacific Gas & Electric Co. building, San Francisco; bids opened March 23.
2200 tons, Chatham apartments, Brookline, Mass.; bids being taken.
1500 tons, Old Colony Trust building, Boston; bids being taken.
1200 tons, Fidelity Bank building, Fresno, Cal.; bids opened March 23.
1100 tons, bridges for Lackawanna railroad; pending.
1100 tons, school No. 11, Twenty-first street, New York; pending.
1100 tons, South street Bridge, Wilkesbarre, Pa.; pending.
1100 tons, bridge at Manchester, N. H.; bids being taken.
1000 tons, department store, Philadelphia; pending.
1000 tons, coliseum for state fair grounds, Albany, N. Y.; pending.
1000 tons, power station Hellgate, New York; pending.
1000 tons, building for Bowles Restaurants, Ltd.; pending.
850 tons, Times-Herald building, Washington; pending.
800 tons, additions to school No. 220; New York; pending.
700 tons, Clarendon building, Winnipeg, Man.; pending.
600 tons, eight apartment buildings in Long Island City for J. G. White; pending.
510 tons, Paintersville bridge, San Francisco; bids open April 20.
450 tons, building for Niagara Falls Trust Co., Niagara Falls, N. Y.; bids asked.
450 tons, school No. 21, New York; pending.
400 tons, state bridge at Fonda, N. Y.; pending.
400 tons, Westmoreland Club, Richmond, Va.; pending.
340 tons, Larkspur apartments, 7338 Euclid avenue, Cleveland; pending.
300 tons, school building at New Haven, Conn.; pending.
300 tons, Steamboat Slough bridge, San Francisco; bids open April 20.
300 tons, building for Y. W. C. A. at Erie, Pa.; project may be refigured.
300 tons, grandstand for park board, Preston, Ont.; pending.
250 tons, high school, West Orange, N. J.; pending.
250 tons, H. B. Smith Foundry, Westfield, Mass.; bids in.
150 tons, south Brooklyn telephone exchange; pending.

Refractories Advance

Pittsburgh, March 27.—Both silica and fire clay brick were advanced last week $5 per 1000, Pennsylvania No. 1, fire clay now being quoted at $48 to $51 and Pennsylvania silica at $47. Maryland fire clay brick also was advanced in like measure to $50 to $53 for the No. 1 grade and to $44 to $45 for the No. 2.

Cranes Are Ordered

Pawling & Harnischfeger Co., Milwaukee, has booked an order for a 15-ton crane with 60-foot span from the Galion Iron Works, Galion, O., and another from the Reeves Mfg. Co., Dover, O., for a 20-ton crane with 46-foot span. The Champion Engineering Co., Kenton, O., has booked an order for a 10-ton crane from the Union Steel Casting Co., Pittsburgh, and one from the Sprague Electric Works, New Kensington, Pa., for a 5-ton special crane.

Car Orders Gain Sharply

Louisville & Nashville Railroad Places 8000 Order—Western Road Inquiring for 50,000 Tons Standard Steel Rails—Spike Price Higher

RAILROAD TRACK MATERIAL PRICES, PAGE 916

New York, March 27.—Heavy buying features the car market, the outstanding order calling for 8000 cars for the Louisville & Nashville. Locomotive orders include 20 for the Seaboard Air Line, awarded the American Locomotive Co.; five for the Elgin Joliet & Eastern, and four for the Ford Motor Co., the last two contracts going to the Lima Locomotive Works. The New York, New Haven & Hartford has closed on 15 locomotives to the American Locomotive Co., and the Midland Valley on three to the Baldwin Locomotive Works. Inquiries include 20 for the Carolina, Clinchfield & Ohio, and 10 electric locomotives for the Pacific Electric Co.

The Erie has placed 2000 gondolas and 2000 box cars.

The New York Central railroad has put out an inquiry for 750 tons of black, blue annealed and galvanized sheets; 25,000 seamless steel tubes, 3000 car and tender axles, 750 tons of wire nails and stay bolts, not to exceed 5000 tons of steel bars, plates and shapes, 350 tons of forging billets and 50,000 cast iron wheels. Bids on these materials will be opened April 2.

Car Buying Comes Back

Chicago, March 27.—Orders for 11,300 freight cars were placed in the Chicago district during the past week, the Illinois Central placing 1000, the Louisville & Nashville 8000 and the Chesapeake & Ohio 2000. The Texas Co. has ordered 300 tank cars. In addition to this, the Fruit Growers Express will build 2000 refrigerators on underframes purchased previously. Records show that railroad freight cars bought since Jan. 1, 1923, total 62,000 cars. Demand for track fastenings continues strong and a large tonnage is coming out each week in all track specialties. One large producer booked about 15,000 kegs of spikes and bolts during the past week. Spikes have been advanced to 3.25c, Chicago, and bolts to 4.25c, Chicago. Tie plates and angle bars are unchanged in price. Inquiry for tie plates is excellent and one lot of 3000 tons is being figured. Light rails are in small demand at 2.25c, Chicago mill, and this product is moving slowly. Some inquiry for standard steel rails is coming out in lots of 5000 to 15,000 tons. One western railroad is inquiring for 50,000 tons.

Railroads Start Buying

Boston, March 27.—New interest in buying has started among New England railroads. The Boston & Maine during the week placed from $60,000 to $70,000 worth of frog and switch material. Inquiry from other roads predicts additional orders before the first of the month.

Track Accessories Active

Pittsburgh, March 27.—Light rail sellers, including some rerollers, all are now on a 2.25c basis the 2.15c base Pittsburgh price no longer being available. Demand only is fair, single carloads from coal mine operators being the rule in the market.

Prices are unchanged at 3.15c for standard spikes, 3.50c for boat and barge spikes, 3.75c for small railroad spikes, 4.00c to 5.50c for track bolts, and a 2.60c minimum for tie plates. The Pennsylvania railroad is understood to have closed on a portion of its 500,000 tie plate requirement, and the Norfolk & Western railroad bought 50,000 tie plates.

Plans 2000 More Cars

Cleveland, March 27.—In addition to the 2000 hopper cars placed last week, the Chesapeake & Ohio railroad is having plans for 2000 automobile cars and bids are to be taken shortly. The Seaboard Air Line has placed 20 locomotives with the American Locomotive Co. and the Kentucky & Indiana Terminals 5 switch engines with the Lima Locomotive Works.

CAR ORDERS PLACED

Illinois Central railroad, 1000 automobile cars, to the American Car & Foundry Co.
Louisville & Nashville railroad, 6000 hoppers, to Pressed Steel Car Co., 1000 box cars to Mt. Vernon Car Mfg. Co., 1000 box cars to Chickasaw Shipbuilding Co.
Fruit Growers Express, 2000 refrigerators, to be built in own shops on underframes bought from Pressed Steel Car Co. and Keith Car & Mfg. Co.
White Eagle Oil & Refining Co., 100 tanks to Pennsylvania Tank Car Co.
Cambria & Indiana, 1000 hoppers, to Cambria Steel Co.
Merchants Dispatch, 1500 refrigerators, own shops.
Southern railroad, 2000 coal cars, to Lenoir Car Works.
Chesapeake & Ohio railroad, 2000 70-ton coal cars, 1000 each to Standard Steel Car Co. and to American Car & Foundry Co.
The Texas Co. 200 tank cars to Pennsylvania Tank Car Co., 50 to Chicago Steel Car Co., 50 to Standard Tank Car Co.
Erie railroad, 2000 gondolas, to Standard Steel Car Co., 1000 box cars to Youngstown Steel Car Co., 1000 box cars to Pressed Steel Car Co.
Missouri Pacific railroad, 1500 box cars repairs, to Sheffield Car & Equipment Co., 700 coal car repairs, to Mt. Vernon Car Mfg. Co.

CAR ORDERS PENDING

Southern Pacific railroad, 300 gondolas; pending.
Southern railroad, 300 ballast cars; pending.
Canadian Pacific, 300 automobile cars; pending.
Bertha Coal Co., 100 hoppers; bids asked.
Chesapeake & Ohio railroad, 2000 automobile; bids to be taken soon.
Chicago & Alton railroad, 200 gondolas; pending.
Atlantic Coast railroad, 500 gondolas, 45 miscellaneous coaches; pending.
Seaboard Air Line, 25 cabooses; pending.
Leonard Construction Co., 415 dry room tray cars; pending.
Illinois Central railroad, 19 coaches, 8 horse cars; pending.
Nitrate Railways Ltd., 300 to 600 flat cars; pending.

Plant Damaged by Fire

The plant of the Western Pipe & Steel Co., Seattle, was damaged by fire on Monday, March 19. It is said that the damage is estimated at between $50,000 and $75,000.

The Feeney Tool Co., Bridgeport, Conn., has been petitioned in bankruptcy by three creditors whose claims total $4040.

Building Bar Needs Heavy

Mills Continue To Be Booked Far Ahead—Prices Show Firmness With Some Advance—Many Orders for Small Tonnages

REINFORCING BAR PRICES, PAGE 916

Chicago, March 27.—As the building season approaches, an unusually heavy demand for reinforcing bars is coming out, in spite of the record breaking tonnages placed during the winter for spring use. This demand promises to bring to sellers a larger aggregate tonnage than they will be able to handle and all are proceeding cautiously to avoid placing themselves in position where they can not meet their delivery obligations. Nine projects ranging from 100 to 350 tons have developed in the Chicago market recently. Each of these appears to be a live project which will go through during the present season. Placing of new business has not been as active during the past week as the appearance of projected structures. A feature is the sale of 650 tons of spirals for the American Furniture Mart at Chicago, which will be furnished by the Kalman Steel Co. The bars for this building were closed several weeks ago with Inland Steel Co. This is an unusual tonnage of spirals for one building. Other lettings at Chicago were for moderate tonnages. The market continues firm at 3.00c, Chicago warehouse.

Many Small Jobs Are Pending

Pittsburgh, March 27.—Several local manufacturing concrete bar bidders, including the Pitt Construction Co., Inc., are interested in the Wheeling, W. Va., filtration plant, bids on which close March 28. This job involves about 700 tons of concrete bars. A large number of small jobs are pending, including many schools taking from 10 to 25 tons each and a few other jobs involving 25 to 50 tons apiece are noted but a lull is being encountered in connection with larger work. While no definite evidence is furnished to show that jobs have been abandoned because of high costs, concrete bar sellers are of the opinion that undue inflation of raw material prices will have that result. On small lots, up to 3.00c warehouse already has been quoted, 2.75c being the ruling figure in connection with larger quantities. Mill deliveries are so much deferred that mill prices now taking in a spread of 2.25c to 2.75c are nominal. The latter figure was named this week by an eastern Pennsylvania steelmaker.

Concrete Awards Taper Off

Cleveland, March 27.—Few awards of large tonnages were made during the past week in the Cleveland district. Small business continued good although even this demand was little sharper than previously. Prices continued firm with 2.25c to 2.35c, base Pittsburgh, being quoted. One interest quoted 2.50c, base Pittsburgh, but not much business was transacted at that figure. Deliveries are advancing with the mills becoming booked farther ahead. Roadwork which was contemplated being commenced with the opening up of the weather has been delayed temporarily by political action.

CONCRETE CONTRACTS PLACED

Awards reported this week	2,280 tons
Awards reported last week.....	10,361 tons
Awards reported two weeks ago....	13,015 tons

650 tons, spirals for American Furniture Mart, Chicago, to Kalman Steel Co.
300 tons, addition to Schuster department store, Milwaukee, to Concrete Engineering Co.
250 tons, extension to piers and docks, at Mare Island navy yards, to W. S. Wetenhall Co.
150 tons, Spinks apartment building, Indianapolis, to Pollak Steel Co.
150 tons, work for Illinois Central railroad, to Corrugated Bar Co.
140 tons, garage, for Paul J. Cornell estate, Chicago, to Truscon Steel Co.
125 tons, dormitory buildings for Sanford university, Palo Alto, to W. S. Wetenhall Co.
115 tons, Peoples bank, Marietta, O., to Kalman Steel Co.
100 tons, miscellaneous for Coddington Engineering Co., Milwaukee, to Truscon Steel Co.
100 tons, road work in Wisconsin; to Corrugated Bar Co.
100 tons, building for John Morrell Packing Co., Ottumwa, Ia., to Corrugated Bar Co.
100 tons, laundry building, Chicago, to Truscon Steel Co.

CONCRETE CONTRACTS PENDING

1600 tons, Sinclair Oil Co., including 24 stills at Marcus Hook, Pa., 24 at Houston, Tex., and 10 at East Chicago.
1300 tons, Hotel Olympic, Seattle; pending.
1000 tons, Elks memorial building, Chicago; pending.
700 tons, bridge work for Chicago & Eastern Illinois railroad; bids in.
350 tons, Markham yard of Illinois Central railroad, Chicago; bids asked.
300 tons, Union Davenport Trust & Savings Bank building, Davenport, Ia.; pending.
300 tons, superstructure for Middle West Power Co., Grand Tower, Ill.; pending.
300 tons, building for Coca Cola Co., Chicago; pending.
300 tons, road construction work for state of Washington; pending.
260 tons, Northwestern Packing Co., Chicago; bids asked.
250 tons, Taft union high school, Taft, Cal.; bids open April 4.
230 tons, crib house at Calumet power station of Commonwealth Edison Co., Chicago; pending.
175 tons, warehouse for International Harvester Co., Cleveland; pending.
150 tons, roundhouse for Elgin, Joliet & Eastern railroad, Gary, Ind.; pending.
125 tons, Bigelow building, Seattle; pending.
100 tons, library for University of Washington, Seattle; pending.
100 tons, roundhouse for Elgin, Joliet & Eastern railroad, Joliet, Ill.; pending.

Pipe Prices

Expected To Be Advanced Again—Demand Continues Strong

PIPE PRICES, PAGE 916 AND 976

Pittsburgh, March 27.—Another advance in pipe prices is expected but nothing definite is announced as yet by producers here. This feeling is enhanced by the issuance March 19 of a new card by the Wheeling Steel Corp., which increased its price on black full weight pipe $4 per ton, and on galvanized $6 per ton. Prior to March 19 its card discount was one point below that quoted by other makers, making its price $2 per ton higher than the going market. This last advance places its present levels $6 per ton above the market quotations of Feb. 1 by independents and Feb. 3 by the National Tube Co. The Wheeling discount on 1 to 3-inch black now is 61 off while other producers still quote 64 off. Prior to March 19 its quotations on galvanized were the same as other producers, 1 to 3-inch being quoted at 52½ off; it now quotes 49½ off. With the issuance of this new card, the Wheeling Steel Corp. adopts the same method of quoting jobbers as inaugurated by other producers some time ago, namely, eliminating the 2½ per cent preferential. All producers now quote jobbers the card discount plus 1 and 5 off instead of the card discount plus 1, 5, 2½ off. Demand for pipe is unceasing, inquiries involving from a single carload up to 1000, 2000 and 2500 tons or more being common. One jobber of standard full weight pipe had a 500-ton order returned by a Youngstown, O. maker early in the year. It since has presented a 300-ton order at least three times, the producer returning it on each occasion and the jobber now has sent the order back with instructions to keep it and ship out the pipe whenever possible. Oil country jobbers in the South and West have commitments for as much as 2000 tons of oil country tubular goods. The aggregate of line pipe business pending closely approximate 50,000 or 60,000 tons, a total of about 400 miles.

$2 Advance Made

New York, March 27.—An advance of $2 a ton has been put into effect by an eastern cast iron pipe manufacturer, with a result the market is now quotable at a range of $63.60 to $65.50, f.o.b. New York, on 4-inch class B pipe, and $58.60 to $60.50 on 6-inch and over. Recent sales include 200 tons of six and 8-inch pipe for Schenectady, N. Y., and 800 tons of 16 and 24-inch pipe for Newark, N. J., both orders going to the Warren Foundry & Machine Co. Action is expected today in the award of the general contracts for buying and installing 4500 tons of cast iron pipe under the Narrows, the low bidder being the Merritt-Chapman & Scott Corp., and 10,000 tons of steel pipe in Brooklyn, the low bidder being T. A. Gillespie & Co.

Big Inquiry Not Yet Out

Chicago, March 27.—While considerable inquiry for cast iron pipe has been received and acted on since the first of the year, the heavy seasonal buying is not yet due, and the market is between seasons. Makers of pipe have such heavy bookings they are not anxious to take on further business and as a result conditions are fairly quiet. Pipe ranges from $47 to $48, Birmingham, for the base grade. Holland, Mich., has awarded 300 tons to the United States Cast Iron Pipe & Foundry Co. Bids will be taken March 28 on 175 tons for a contractor's job at Morristown, Minn.

Lettings Still Coming In

Birmingham, Ala., March 26.—All producers in this district of cast iron pipe, pressure pipe especially, have many orders in hand and lettings are still coming in. The recent advance in price has had but little effect on the demand. Production is being pushed rapidly to capacity. Small sizes continue to be in demand. Apprehension is expressed that a runaway market may develop from present conditions and the request is being made by producers that only such pipe as is needed in emergency be ordered at this time.

Coast Requirements Large

Heavy Demand Brings Increase of Prices in Many Lines—Difficulty Encountered in Obtaining Structural Shapes—Sheet Demand Heavy

SAN FRANCISCO, March 24.—Demand for iron and steel products in the local market is unusually heavy and consumers are finding it almost impossible to get prompt deliveries regardless of price. General business conditions are excellent, building and construction programs are increasing and oil field activity is the greatest in the history of the coast.

Pig Iron and Coke

Scotch and English iron has advanced, the best price reported this week being $37, c.i.f. duty paid San Francisco for iron running 2.25 to 2.75 in silicon. No. 2 southern iron has advanced $1 a ton to $27 base, Birmingham. Demand from foundries is increasing but sales are confined to small tonnages. One interest has an inquiry out for 500 tons running 3.25 to 3.75 in silicon. The smaller lots are being quoted at from $38 to $39 a ton. Coke prices are stiffening and $16.50 a ton for by-product appears to be the minimum while the beehive product is being sold as high as $23 a ton for the better grades.

Bars, Plates and Shapes

Bookings have fallen off somewhat although demand for concrete bars is increasing. The Oregon State Highway commission will open bids on March 27 for 300 tons of bars and shapes for five bridges.

Most plate producers are out of the market and prices have again advanced. The minimum now obtainable is 3.10c, c.i.f. San Francisco and 3.20c and as high as 3.30c is being asked. The leading interest and Bethlehem remain out of the market. An inquiry is before the trade for approximately 1000 tons of boiler and firebox steel for the Southern Pacific Co. The Petroleum Midway Co. has closed with Riter-Conley Co. for 20 80,000-barrel tanks involving 6000 tons. Bids will be opened on April 4 for about 400 tons for riveted steel pipe for the Thermalito Irrigation district at Oroville, Cal.

The situation in shapes has not improved. While 3.05c, c.i.f., San Francisco can be obtained this week on a three months mill shipment basis, selected tonnage, one mill is quoting 3.10c, Atlantic seaboard, equivalent to 3.40c, c.i.f. San Francisco for three to four weeks mill shipment. In the issue of IRON TRADE REVIEW, March 15, it was reported that the Golden Gate Iron Works secured 300 tons for the Western Sugar Co.'s warehouse in Oakland. This was in error, as the Western Iron Works, was awarded the tonnage. Goold & Johns were low bidders on the general contract for the civic auditorium, Stockton Cal.

Other Finished Material

Demand for sheets is heavy and most producers are now out of the market for second quarter. The few mills are asking 3.10c, 3.85c and 5.00c; base Pittsburgh for blue annealed, black and galvanized sheets respectively while 3.85c and 5.00c respectively is considered the minimum.

The Southern Pacific Co. has closed for 2050 kegs of heat-treated track bolts and is asking for 3000 kegs of track spikes and 60 tons of button head rivets. Peterson Shirley & Gunther, Omaha, Neb., were awarded a contract for 330 miles of railroad between Casper, Wyo., and Miles City, Mont., which will involve about 50,000 tons of track material, for the Middle States Oil Co.

Demand for pipe continues heavy and consumers are pressing for delivery. New wells started during the week ending March 17, as reported to the state oil and gas supervisor, numbered 51 as compared with 35 the previous week. Total to date is 355; total same date last year 271. Deepening or redrilling jobs numbered 18, as compared with 20 the preceding week. Total to date this year 174; total same date last year 165.

Demand for cast iron pipe from private sources remains quiet. The United States Cast Iron Pipe Co. secured 115 tons of 5 and 8-inch for Fullerton and 344 tons of 4 to 8-inch for Alhambra, Cal., Canta Cruz, Cal., will open bids on March 27 for 114 tons of 4 and 8-inch and Los Angeles county will take bids on March 27 for 385 tons.

Old Material

Prices on heavy melting steel have advanced recently and $14.50 to $15.00 delivered mill is considered the prevailing price. Cast iron scrap is being held at from $26 to $28 a ton.

Warehouse Market

All lines are active and demand is coming in from all sources. Warehouse prices on bands in the local market have been advanced from 4.30c to 4.40c. Los Angeles jobbers have put into effect new prices as follows: Bars from 3.85c to 4.20c, shapes from 3.80c to 4.30c, blue annealed from 4.70c to 4.95c, black sheets No. 28 gage from 6.10c to 6.35c, galvanized sheets No. 28 gage from 6.90c to 7.10c, bands from 4.60c to 5.10c and cold-rolled shafting from 5.10c to 5.40c.

Northwest Demand Strong

SEATTLE, March 24.—Iron and steel products are in strong demand in Washington and Oregon. The situation is extremely firm as evidenced by additional price increases during the week. All classes of material are showing a heavy turnover. Building continues active notwithstanding the high costs of some construction materials. Public improvement work is opening up with the approach of spring. Both Washington and Oregon have large road building programs for the year. The Seattle school district has adopted tentative building plans involving the expenditure of $800,000 this year. Bids are to be called shortly for two office buildings, one ten stories and the other seven stories.

Pig Iron and Coke

Sustained firmness and continued active demand are the features of this market. The best grades of foreign iron are now being quoted at $40 as against $38 a week ago. Iron in this territory is being imported from England and Scotland. Heretofore southern iron has been shut out from the Pacific coast market as it could not compete. In view of the higher prices of European iron, it is thought that southern iron may now be able to enter this field although some southern producers are out of the market at present. The demand continues strong in this territory, foundries being fairly well stocked.

Signing of a wage agreement at the Fernie mines has relieved the expected strike situation. Jobbers, are selling a large volume of Fernie, the price remaining at $16.50.

Bars, Plates and Shapes

Jobbers have advanced prices on steel bars from 3.85c to 4.00c effective March 19. Shapes underwent a similar advance while plates were advanced from 4.00c to 4.25c. These increases place the coast market in line with base prices, the new jobbers' list applying to both Washington and Oregon. Jobbers report a fine volume of business in all these items. The export inquiry for reinforcing bars continues. The Pacific Coast Steel Co. this week was awarded a contract for 600 tons for delivery in China. It is known that local interests have figured on between 2000 and 3000 tons of reinforcing material for export to the Orient.

Other Finished Material

Effective March 19 jobbers in this territory raised the prices of sheets 25 cents for 100 pounds action anticipated for several weeks. The new prices are: Blue annealed, 5.10c; black, 6.10c; galvanized, 7.10c. The prices of bands, hoops and cold-rolled shafting are unchanged. The advances are in line with higher mill prices. All these materials are being absorbed by the trade in large volume. The agricultural sections of the two states are beginning to fill their spring requirements, while logging and lumbering industries are heavy buyers. There is also increased activity at the various drydocks and marine repair plants. Nails, spikes and all building materials are in especially good demand. The entire market is firm.

Old Materials

Dealers are having difficulty in supplying the demand. The market is firm and prices have advanced. No. 1 cast iron scrap is firm at from $26 to $28.50. Cast car wheels are hard to get at $22 while steel scrap is in good demand at $15 to $16 with offers of about $13 for mixed country scrap. Stocks are low and dealers are scouring every possible source of supply.

Editors Are Entertained at Middletown

Editors of the business press comprising the National Conference of Business Paper Editors were entertained at Middletown, O., March 26 and March 27 as the guests of the chamber of commerce of that city. Bennett Chapple, director of publicity of the American Rolling Mill Co., Middletown is retiring president of the Middletown chamber of commerce and directed the affair. About 50 editors were in attendance. The latter were permitted to observe all phases of the process of making steel and of converting it into sheets at the plant of the American Rolling Mill Co. and also of studying production operations in other industrial plants of Middletown. At the formal session the visiting editors were welcomed by a letter from George M. Verity, president, the American Rolling Mill Co. who is in California. C. R. Hook, vice president and general manager of the American company, gave an interesting account with charts showing how this company keeps all its employes thoroughly informed as to its financial and trade status, spreading a spirit of co-operation and mutul good feeling throughout the organization. A. J. Beatty, director for training told how business economics are taught to student classes of working men, and by S. R. Rectanus, assistant manager of the Ashland, Ky., division. Sherman Perry, correspondence advisor for the company, detailed methods by which 'our letters produce more profits."

L. T. Palmer, president of the Middletown chamber of commerce presided at the banquet held at the hotel Monday evening. The recreational and community interests of the city were set forth by various speakers. M. Feiker, vice president of the McGraw-Hill Publishing Co., New York, who recently has been appointed by Secretary Hoover to establish an organization to investigate rubber, sisal and other raw products, with a view to the possible need of producing these commodities in our country, responded on behalf of the visiting editors.

Steel Mill Operations Still on High Plane

Pittsburgh, March 27.—The Carnegie Steel Co. is operating approximately at 92 per cent of ingotmaking capacity. This is indicative of the high rate of operation among steel mills here. It has 49 out of 59 blast furnaces producing pig iron although others are being warmed up and it hopes soon to operate three or four more. The list includes Edith, Sharon, Niles and Bellaire. The Sharon, Pa. furnace has been reported on but as yet it is not making iron.

The date for the starting up of the Steward Furnace Co.'s stack at Steward, Pa., has been advanced from May 1 to April 15. With Ella and Fannie furnaces of the Reliance Coke & Furnace Co., and M. A. Hanna & Co., respectivelv; the second Josephine, Pa., furnace of the McKinney Steel Co.; the Leetonia, O. stack of the McKeefrey Iron Co.; the Sharpsville, Pa., furnace of Allen S. Davison Co.; the Atlantic, New Castle, Pa., furnace of Republic Iron & Steel Co., and various other small stacks here and there in Ohio and Pennsylvania all becoming active during March and April, pig iron production for those two months undoubtedly will reached new high levels.

The Dover, O., furnace of M. A. Hanna & Co., was blown out March 18 for minor repairs. This will be blown in again April 1. A similar period of inactivity will be necessary for the Struthers furnace, possibly during April.

Valley Steel Operations Equal War Rate

Youngstown, O., March 27.—Finishing mill and steelwork's operation throughout the Mahoning valley this week assumed wartime proportions. Only one sheet mill is inactive leaving 116 scheduled or 99 per cent of capacity. The Youngstown Sheet & Tube Co. is operating 27 at three plants of its Brier Hill division and 15 at its East Youngstown works; the Republic Iron & Steel Co. and the Newton Steel Co. 17 each; the Trumbull Steel Co. 15; the Sharon Steel Hoop Co. 9; and the Falcon Steel Co. and the Mahoning Valley Steel Co. 8 each.

For the ninth consecutive week independent open-hearth operation is 88 per cent of capacity. This represents 45 active units of the 51 in the district distributed 12 at the Republic Iron & Steel Co., 11 at the East Youngstown plant and 10 at the Brier Hill division of the Youngstown Sheet & Tube Co., 7 at the Trumbull Steel Co., and 5 at the Sharon Steel Hoop Co. Blast furnace operation stands at 93 per cent of capacity with but 2 stacks inactive.

Miscellaneous operation includes 2 plate, 2 bar and 10 pipe mills and the rod, wire and bessemer departments at the Youngstown Sheet & Tube Co., 19 hot tin mills and all strip departments at the Trumbull Steel Co., and 6 pipe furnaces, 7 finishing mills and the bessemer department at the Republic Iron & Steel Co.

Lackawanna Runs High

Buffalo, March 28.—Bethlehem Steel Co.'s Lackawanna plant is operating at 85 per cent and booked solidly over the first half of the year on bars, billets, standard shapes and plates. Seven out of nine blast furnaces are in operation and the other two will be in blast within a short time. Four hundred new houses will be built in the city of Lackawanna by the company for its employes.

Planning for Coke Plant

Pittsburgh, March 27.—The National Tube Co. is preparing to make a big fill and build a slag wall in its property in Dravosburg, with a view of beginning work on a new by-product coke plant to be built on a Monongahala river frontage of several thousand feet. The company has asked the borough council to pass an ordinance for a bridge across Washington avenue, near Curry Hollow, which is to be used to carry cars of slag and other material from the tracks of the Pennsylvania railroad. The ordinance is expected to be passed in a few weeks. It was presented to the borough council by W. A. Cornelius, manager of the National company's works in McKeesport, Pa. The company acquired the land several years ago.

Buy Obsolete Warships

Washington, March 27.—The navy department has awarded the obsolete battleships OHIO and KENTUCKY, upon which bids were opened March 6, to the Dravo Contracting Co., Pittsburgh, for a total of $216,000. The ships, which would have been scrapped regardless of any limitation upon armaments, have been stripped and are valued only for the metal in their hulls.

Furnaces To Resume

The furnace of the Lavino Furnace Co. at Reusens, Va. is being prepared for operation and probably will be lighted about May 15 on foundry iron. Preparations also are being made to blow in the Goshen, Va. stack sometime in April on foundry iron.

The Central Boiler & Sheet Metal Works, Indianapolis, has filed a preliminary certificate of dissolution with the secretary of state.

Foreign Markets Less Active

Large Tonnages Ordered from Continent Being Replaced, Due To Inability of Makers To Deliver—Stinnes Interests Buy 15,000 to 20,000 Tons of Plates in Czecho-Slovakia—Scotch Iron Offered at $32.90 c. i. f., New York

Iron Trade Review Staff Cable

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IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

LONDON, March 26.—Buying of iron and steel is heavy from all quarters to replace orders for continental material the delivery of which has been delayed. The British market, however, is less feverish. Germany is showing more caution in buying, in respect to prices.

Quotations in the British market have advanced further, buyers considering the higher figures over the Easter holiday. A Scotch mill has advanced the price of plates for export to £10 10s ($49.35), but some tonnage still is available at £10 ($47). Another Scotch maker has sold to Germany 5000 tons of plates at £9 7s 6d ($43.94), f.o.b., but has since advanced its prices. Stinnes interests have

Sterling—$4.70

closed for 15,000 to 20,000 tons of plates and shapes with the Witkowitz works in Czecho-Slovakia.

A leading French interest is unable to obtain delivery of several thousand tons of plates for Canada ordered from a Luxemburg mill at £9 5s ($43.47) c.i.f. Montreal, and has been forced to reorder the tonnage from a Welsh mill at £10 ($47), f.o.b.

Scotch foundry iron is being offered at £7 ($32.90), c.i.f., New York, but no sales are reported. Armstrong, Whitworth & Co. have taken 61 locomotives, mainly for Africa and South America. India is inquiring for large tonnages of rails and may buy in America, British quotations having been advanced to £9 15s ($45.82).

French consumers are obtaining a little more coke and the French market still is feverish. The supply of pipe is short, sales being made at 30 to 50 plus list according to delivery. No. 3 French foundry iron is quoted at 545 francs ($35.97), French finished steel quotations range from 750 to 800 francs ($40.87 to $43.60). A dispatch from Berlin reports further buying by the Germans from producers in England and Czecho-Slovakia. Prices of the mark are unchanged. Inland demand is less active. The German policy of passive resistance shows no weakness.

Changes in the British market in the last week bring the price of billets to £9 5s ($43.47); sheet bars £9 10s

Franco-German Industrial Alliance Predicted

Iron Trade Review Staff Cable

LONDON, March 26.—That the Ruhr industrial war will end in three or four months with German and French industrial leaders in agreement respecting the disposition of Ruhr coal and Lorraine iron ore is the opinion expressed to the German correspondent of IRON TRADE REVIEW by a prominent iron ore merchant and manufacturer of coal briquets in Dusseldorf. This merchant discloses the extent to which Germany has made purchases of coal, coke and finished steel in the United States. He says:

"The Ruhr industrial war will continue three to four months more. The industrialists are unyielding and moody; though there is little danger of a military war.

"Business reorganization after a settlement between Germany and France will be rapid. The Germans are not buying French iron ore now, but a settlement is almost sure to involve a closer alliance than ever before, dominated more or less by the French, between German and French iron and steel producers and based on coal from the Ruhr and iron ore from Lorraine. Such a combination would be one of the most powerful competitors in the markets of the world.

"Two-thirds of Germany's iron and steel industries at this time are useless, and they will do relatively little export business until a political settlement is effected. Germany for several months will be a heavy importer of iron, steel and fuel. She has already purchased nearly 500,000 tons of American coal and coke, but will get iron and steel supplies nearer home. Germany also has purchased nearly 50,000 tons of American finished steel, especially wire and pipe, to fill orders from South America and the East which cannot be met with shipments from the Ruhr. A substantial portion of this business was placed with the United States Steel Products Co. Too long a time required for delivery is hampering further purchases; and, also, English shapes, plates and bars are cheaper.

"Germany would like to buy 250,000 tons more of American steel to cover export contracts but it is feared that prices and late delivery will preclude this. When the industrial war in the Ruhr ends it is unlikely that accumulated stocks of finished steel will be enough to affect seriously the world markets, especially since in the unoccupied portion of Germany there will be a shortage.

"Production in the Ruhr district is now at the lowest point. The rate of output of pig iron is down to 50,000 tons monthly, due to a shortage of limestone, all deposits being outside of the Ruhr. No pig iron stocks are accumulating. Ruhr mines, however, have stocked 3,000,000 tons of coal. No batteries of coke ovens have yet been allowed to get cold. Considerable machinery and engineering production is going into stock, the government loaning money to manufacturers for this purpose.

"Few Germans dare to apply for French export licenses, the government threatening to impose sentences of 10 years in jail for violation of its order. It is believed that the eventual settlement will include provision for a French export tax for a long time. Then it will be necessary to adjust the present flat rate of 10 per cent ad valorem to the traffic, 10 per cent being too much for coal and iron and too little for automobiles, machine tools, highly finished goods and the like. The French recently imposed a flat tax of 10 per cent on imports, and this tax has stopped the imports. Iron ore was unaffected since few stacks are in operation.

"The Germans prepared for passive resistance by organization before the occupation. The French were surprised, especially by its effect on the Lorraine steelmakers. It is hoped that the economic loss to France will secure easier terms for Germany when a settlement is made. It is simply a case of a gigantic strike which must continue until economic losses reduce both contestants to a more reasonable frame of mind."

Current Iron and Steel Prices of Europe

Prices Last Reported Converted into Dollars at Rates of Exchange, March 26

British Market

Home Market Prices. Gross Tons at Works or Furnace

Corrected to Date by Cable

	$	£ s d
SEMIFINISHED STEEL		
Billets, soft steel	43.47	9 5 0
Sheet bars	44.65	9 10 0
Wire rods	59.93	12 15 0
FINISHED STEEL		
Steel bars, England, ¾ to 3-inch	52.88	11 5 0
Steel bars, England, ⅝ to 3-inch, for export	50.53	10 15 0
Plates, ship, bridge and tank, England	47.00	10 0 0
Plates, ship, bridge and tank, Scotland	47.00	10 0 0
Beams, England	47.00	10 0 0
Beams, Scotland	47.00	10 0 0
Sheets, black, 24 gage	61.00	13 0 0
Sheets, galvanized, 24 gage	90.48	19 5 0
Rails, 60 lbs. and over	47.00	10 0 0
Rails, 60 lbs. and over, for export	45.82	9 15 0
Tin plate, base box, 108 lbs.	5.51	1 3 6
Steel hoops	59.93	12 15 0
Steel hoops, for export	56.40	12 0 0
PIG IRON		
Hematite, East Coast, Mixed Numbers	29.37	6 5 0
Hematite, West Coast, Mixed Numbers	29.37	6 5 0
Basic Middlesbrough	28.78	6 2 6
No. 3 Foundry, Middlesbrough	29.97	6 7 6
No. 3 Foundry, Derby, Leicester, Nottingham	27.02	5 15 0
No. 3 Foundry, Northamptonshire	25.85	5 10 0
No. 3 Foundry, Staffordshire	25.85	5 10 0
No. 3 Foundry, Scotch	28.20	6 0 0
Ferromanganese, 76 to 80 per cent	75.20	16 0 0
COKE		
Yorkshire furnace	8.23	1 15 0
Yorkshire foundry	8.23	1 15 0

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported

	$	Marks per metric ton
PIG IRON		
Hematite, Oberhausen	33.92	678,300
Foundry, No. 3, Oberhausen	32.27	645,300
Bessemer Stahleisen, Siegen	36.82	736,300
Foundry, No. 1, Oberhausen	32.42	648,300
Luxemburg foundry	31.77	635,300
COKE		
Ruhr furnace	5.29	105,740
Ruhr foundry	5.45	108,950
SEMIFINISHED STEEL		
Billets	41.85	837,000
Sheet bars	45.85	917,000
Wire rods	Nominal	Nominal
Raw ingots	37.45	749,000
FINISHED STEEL		
Standard rails	51.25	1,025,000
Merchant bars	52.15	1,043,000
Structural shapes	51.70	1,034,000
Ship plates	55.75	1,115,000
Medium plates, 3 to 5 millimeters	66.20	1,324,000
Sheets, below 3 millimeters	75.90	1,518,000
Tin plate	192.50	3,850,000
Plain wire	55.60	1,112,000
Bands and strips	63.05	1,261,000
Sheets below 1 millimeter	82.45	1,649,000

All prices are f.o.b. furnace or mill.

French Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Hematite, Lorraine	36.96	560
Basic bessemer, Lorraine	33.00	500
Foundry, Longwy, No. 3, sand-cast	31.35	475
Foundry, Longwy, No. 3, chill-cast	33.00	500
Ferromanganese, 76 to 80 per cent	75.90	1,150
COKE		
French furnace	8.91	135
German, furnace, f.o.b. frontier*	13.07	198
German, furnace, f.o.b. frontier**	20.46	310
French foundry	9.57	145
SEMIFINISHED STEEL		
Blooms, open-hearth	40.59	615
Billets, open-hearth	42.57	645
Sheet bars, open-hearth	43.89	665
FINISHED STEEL		
Standard rails	36.30	550
Merchant bars	52.80	800
Angles	48.51	735
Normal beams and profiles	48.51	735
Plates, ship and tank, 10 millimeters and thicker	52.80	800
Plates, bridge and tank, 5 to 10 millimeters	56.43	855
Sheets, black, 3 millimeters	59.07	895
Sheets, blue annealed, 2 millimeters	59.40	900
Shafting, cold-drawn, 40 to 60 millimeters	85.80	1,300
Bars, 2 per cent nickel steel	110.55	1,675

All prices are f.o.b. furnace or works.
*Up to 50 per cent of normal requirements.
**Over 50 per cent of normal requirements.

Belgian Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Basic bessemer, Belgian	29.93	525
Basic open-hearth, Belgian	29.93	525
Gray forge, Belgian	15.39	270
Foundry, No. 3, Belgian	31.35	550
Foundry, No. 3, Luxemburg	29.93	525
Foundry, No. 3, Lorraine	29.93	525
SEMIFINISHED STEEL		
Blooms	35.63	625
Billets	37.05	650
Sheet bars	39.90	700
Wire rods	57.00	1,000
FINISHED MATERIAL		
Standard rails	41.33	725
Merchant bars	44.18	775
Normal beams and profiles	39.90	700
Plates, 5 millimeters and thicker	47.03	825
Sheets, black, 3 millimeters	54.15	950
Sheets, galvanized, 1 millimeter	111.15	1,950
Plain wire	74.10	1,300
Galvanized wire	85.50	1,500
Wire nails	57.00	1,000

All prices are f.o.b. furnace or works.

($44.65); plates and beams for home and export £10 ($47.30); rails for domestic use £10; tinplate £1 3s 6d ($5.51); East and West Coast hematite £6 5s ($29.37), and Middlesbrough basic £6 2s 6d ($28.78).

Ruhr Stocks of Iron and Steel Grow

European Special Service

DÜSSELDORF, Germany, March 15.—The situation at present is that most of the steel works in the Ruhr are operating intermittently and at reduced capacity. The blast furnaces generally speaking are in serious difficulties owing to scarcity of raw material, particularly limestone and coke. Very little material is moving out of the district and the stocks are accumulating. Undoubtedly a large portion of the stocks will be thrown on the world's markets later on. It is impossible at present to estimate how much iron and steel has been stocked in the Ruhr in the past month, but it runs into a few hundred thousand tons.

There is some traffic by rail both for passengers and freight but it is irregular and generally speaking very little freight is moving except food.

Prices are showing a falling tendency due to the fact that the value of the mark is improving slowly. Wages are still rising but at a less rapid rate.

At present the French authorities are not interfering with the importation of iron ore from Sweden and Spain but have prevented the discharge of lighters at Duisburg and Ruhrort and at various works on the canal system because of nonpayment of the recently imposed French import duty of 10 per cent ad valorem. In some cases this duty has been paid and in others the works are refusing to pay it. Some buyers are stocking their ore at Rotterdam hoping to bring it to Germany later on after conditions become more settled.

Iron Ore Is Advanced 50 Cents

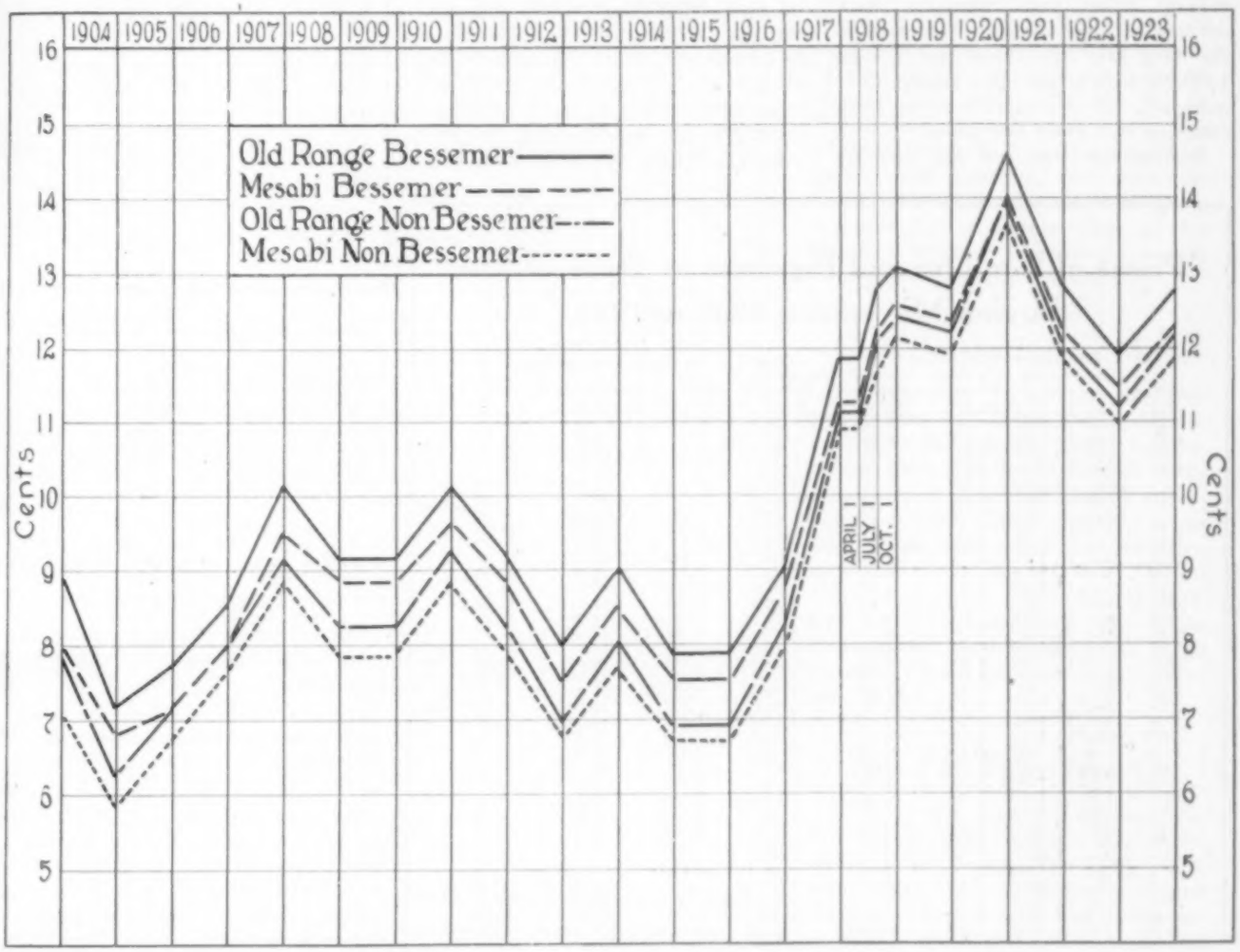
New Prices of Standard Lake Superior Grades Same as in Effect in 1919 and 1921— Less Than Average, in Proportion to Prevailing Iron Prices— Large Tonnages Closed for with Leading Shippers

PRICES of Lake Superior iron ore for the season of 1923 have been established at an advance of 50 cents a ton on all base grades over the prices in effect in 1922. The large producing interests now are quoting as follows: Old range bessemer ore $6.45; Mesabi bessemer $6.20; Old range nonbessemer $5.70 and Mesabi nonbessemer $5.55, delivered, rail of vessel, lower lake ports. Prices expressed in values of units of iron, natural, are as follows: Old range bessemer 12.818 cents; Old range nonbessemer 12.233 cents; Mesabi bessemer 12.364 cents, and Mesabi nonbessemer 11.942 cents.

These are the same prices that were in effect in 1919, following the government's relaxation of price control. An increase of $1 a ton was made in 1920, and then in 1921 a reduction of $1. Another reduction of 50 cents was made in 1922. The new prices therefore are the same as were quoted in 1921, this making the third time since 1918 that they have been quoted.

The prices are below the proportionate average of the last 15 years when considered in relation to the price of pig iron at the date of the buying movement. The average price of standard Mesabi nonbessemer ore has been 20.5 per cent of the price of basic pig iron as quoted in the valley on the date of the ore buying movement. The same grade of ore as quoted for 1923 is about 18 per cent of the price of basic iron, now selling at $31 a ton, valley.

The first sale of ore was announced by one of the largest producing interests that is favorably situated with respect to costs, and can ship about 4,000,000 tons of iron ore in a season. The announcement was made on Saturday, March 24, the earliest date for the beginning of buying since 1917. All of the other important producers adopted this interest's prices to apply on contracts, reservations and new inquiries. Up to the last moment there was considerable difference of opinion as to what the price advance would be; some operators expected to ask 75 cents more than last year, while a few mentioned an increase of $1 a ton. Increased costs of material and labor and the fact that the shippers received no satisfaction from the examiner for the interstate commerce commission in the upper lake rate case



RANGE OF LAKE SUPERIOR ORE PRICES BY UNITS OF IRON, NATURAL

Percentage of Advances and Declines in Iron Ore and Pig Iron

Year	Date of Ore Buying	Mesabi Nonbessemer	Advance or Decline	Advance or Decline Per Cent	Basic Pig Iron Valley	Advance or Decline	Advance or Decline Per Cent
1923	March 24, 1923	$ 5.55	+$0.50	+ 9.9	31.00	+$ 6.00	+24.0
1922	June 9, 1922	5.05	— 0.50	— 9.0	25.00	+ 3.50	+16.2
1921	June 16, 1921	5.55	— 1.00	—15.2	21.50	— 18.50	—46.2
1920	Feb. 2, 1920	6.55	+ 1.00	+18.0	40.00	+ 14.25	+51.4
1919	April 28, 1919	5.55	.20	— 3.4	25.75	— 7.25	—21.9
*1918	Oct. 1, 1918	5.75	+ .25	+ 4.5	33.00	+ 1.00	+ 3.1
	July 1, 1918	5.50	+ .45	+ 8.9	32.00		
	April 1, 1918	5.05			32.00	+ 7.00	+28.0
1917	Nov. 22, 1916	5.05	+ 1.50	+42.2	25.00	— 7.00	—38.8
1916	Dec. 7, 1915	3.55	+ .75	+26.7	18.00	+ 5.50	+44.0
1915	April 19, 1915	2.80	— .05	— 1.7	12.50	— .50	— 3.8
1914	May 1, 1914	2.85	— .55	—16.1	13.00	— 3.50	—21.2
1913	Nov 19, 1912	3.40	+ .55	+19.2	16.50	+ 3.50	+19.2
1912	March 20, 1912	2.85	— .65	—18.5	13.00	— .75	— 5.4
1911	April 21, 1911	3.50	— .50	—12.5	13.75	— 3.50	—20.2
1910	Dec 24, 1909	4.00	+ .50	+14.2	17.25	+ 3.00	+21.0
1909	May 10, 1909	3.50			14.25	— 1.25	— 8.0
1908	June 15, 1908	3.50	— .50	—12.5	15.50	— 6.50	—29.5

* Prices for 1918 established by the government

were cited as reasons for wanting more than 50 cents.

The Ford Motor Co. which inquired for around 300,000 tons of ore claimed to have received quotations from a number of the leading producers about the middle of last week, and was urging others to submit their figures. Several other large tonnages were pending. The company announcing the first sale has closed for around 1,000,000 tons in the open market since Saturday. It is understood the Ford company will close this week.

Demand for iron ore has been so early and urgent that competition has been more in evidence than in several years.

Certain producers state that the increase of 50 cents will hardly cover costs, when the addition to royalties based on selling prices are figured in. Vessel rates have not been established, but it is generally assumed that they, like ore prices, will be restored to the levels of 1921, representing an advance of 10 cents a ton over 1922. Indications point to a shipment of 55,000,000 tons of ore from the Lake Superior district this season.

Prices of Iron Ore and Pig Iron at Date of Ore Buying Movement, 1890 to 1923

Season	Date buying movement	Old range Bessemer	Mesabi Bessemer	Old range non-Bessemer	Mesabi non-Bessemer	Iron Prices Valley Bessemer	Valley Foundry Iron No. 2
1923	Mar. 24, 1923	$6.45	$6.20	$5.70	$5.55	$31.00	$31.00
1922	June 9, 1922	5.95	5.70	5.20	5.05	25.00	24.00
1921	June 16, 1921	6.45	6.20	5.70	5.55	23.00	22.50
1920	Feb. 2, 1920	7.45	7.20	6.70	6.55	41.00	40.00
1919	Apr. 28, 1919	6.45	6.20	5.70	5.55	27.95	26.75
*1918	Oct 1, 1918	6.65	6.40	5.90	5.75	35.20	34.00
	July 1, 1918	6.40	6.15	5.65	5.50	35.20	33.00
	Apr. 1, 1918	5.95	5.70	5.20	5.05	35.20	33.00
1917	Nov. 22, 1916	5.95	5.70	5.20	5.05	30.00	26.00
1916	Dec. 7, 1915	4.45	4.20	3.70	3.55	18.50	18.00
1915	Apr. 19, 1915	3.75	3.45	3.00	2.80	13.60	12.75
1914	May 1, 1914	3.75	3.50	3.00	2.85	14.00	13.25
1913	Nov. 19, 1912	4.40	4.15	3.60	3.40	17.25	17.50
1912	Mar. 20, 1912	3.75	3.50	3.00	2.85	14.25	13.25
1911	Apr. 21, 1911	4.50	4.25	3.70	3.50	15.00	13.75
1910	Dec. 24, 1909	5.00	4.75	4.20	4.00	19.00	17.25
1909	May 10, 1909	4.50	4.25	3.70	3.50	14.75	14.25
1908	June 15, 1908	4.50	4.25	3.70	3.50	16.00	15.00
1907	Nov 5, 1906	5.00	4.75	4.20	4.00	21.50	21.50
1906	Dec. 5, 1905	4.25	4.00	3.70	3.50	17.25	17.25
1905	Feb. 1, 1905	3.75	3.50	3.20	3.00	15.50	16.00
1904	Apr. 15, 1904	3.25	3.00	2.75	2.50	13.35	13.15
1903	Mar. 20, 1903	4.50	4.00	3.60	3.20	21.50	21.65
1902	Feb. 1, 1902	4.25	3.25	3.25	2.75	15.90	15.90
1901	Apr. 15, 1901	4.25	3.25	3.00	2.75	16.15	14.40
1900	Dec. 15, 1899	5.50	4.50	4.25	4.00	24.15	22.15
1899	Feb. 1, 1899	3.00	2.40	2.15	2.00	10.30	9.75
1898	Mar. 20, 1898	2.75	2.25	1.85	1.75	9.55	9.80
1897	May 20, 1897	2.60	2.25	2.15	1.90	8.35	8.40
1896	May 1, 1896	4.00	3.50	2.70	2.25	12.40	11.15
1895	Apr. 1, 1895	2.90	2.19	2.25	1.95	9.40	9.40
1894	Mar. 1, 1894	2.75	2.35	2.50	no sale	9.65	9.65
1893	Mar. 15, 1893	3.85	3.00	3.20	no sale	12.65	12.15
1892	Jan. 31, 1892	4.50	no sale	3.65	no sale	15.00	13.65
1891	June 1, 1891	4.50	no sale	4.25	no sale	15.15	15.00
1890	Dec. 15, 1889	5.50	no sale	5.25	no sale	22.15	18.15

* Figures for 1918 established by the government.

A dispatch to IRON TRADE REVIEW from Duluth says:

"A rumor is current here that the Oliver Iron Mining Co., subsidiary of the United States Steel Corp., will soon announce an increase in miners' wages. A labor shortage is feared after the shipping season opens. Mines are working full time and are accumulating stockpiles. An official of the Great Northern ore docks at Superior states that he expects those docks will handle 16,000,000 tons of ore this season, a record."

The Lake Superior Iron Ore association reports consumption of ore, dock balances and comparisons as follows:

	Tons
Ore consumed in January	4,998,578
Consumed in February	4,670,787
Decrease in February	327,791
Consumed in February, 1922	2,505,702
On hand at furnaces March 1	22,600,686
On Lake Erie docks March 1	7,917,984
On hand at furnaces and Lake Erie docks March 1	30,518,670
On hand at furnaces and Lake Erie docks March 1, 1922	31,206,263

Lake Superior Iron Ore Unit Values

	OLD RANGE Non-Bessemer Cents	OLD RANGE Bessemer Cents	MESABI Bessemer Cents	MESABI Non-Bessemer Cents
1923	12.818	12.233	12.364	11.942
1922	11.909	11.262	11.454	10.971
1921	12.818	12.233	12.364	11.942
1920	14.636	14.175	14.182	13.883
1919	12.818	12.233	12.364	11.942
*1918				
Oct. 1	13.182	12.621	12.727	12.330
July 1	12.727	12.136	12.273	11.845
Apr. 1	11.909	11.262	11.454	10.971
1917	11.909	11.262	11.454	10.971
1916	9.181	8.349	8.727	8.058
1915	7.909	6.990	7.455	6.699
1914	7.909	6.990	7.455	6.699
1913	9.091	8.155	8.636	7.767
1912	7.909	6.990	7.455	6.690
1911	9.273	8.349	8.818	7.961
1910	10.182	9.320	9.727	8.932
1909	9.271	8.350	8.818	7.961
1908	9.271	8.350	8.818	7.961
1907	10.182	9.320	9.727	8.932
1906	8.553	8.144	8.113	7.736
1905	7.671	7.107	7.231	6.792
1904	7.231	6.344	6.790	5.871
1903	8.994	7.954	8.112	7.196
1902	8.553	7.481	6.793	6.344
1901	8.553	6.818	6.793	6.344
1900	10.59	8.541	8.836	8.247

Fluctuations of iron ore prices expressed in values of units of iron in natural state.

*Figures for 1918 established by government.

Iron Ore To Go Direct To Ford Furnace

Detroit, March 27.—Work of widening, dredging and deepening the River Rouge just below the Ford Motor Co.'s blast furnaces and tractor plant will begin at once under government supervision. An arrangement has been reached with the government for the acquisition of additional property near Fort street belonging to the Detroit United railways and the Detroit, Toledo & Monroe electric railway, to widen the river at this point. Shippers have been told the Rouge will be made available for the handling of large ore steamers direct to the Ford plant this season.

Construction Buyers Are Striking

Effect of High Costs and Bidding for Labor Already Evident, Official of General Contractors Declares—Endorses Secretary Hoover's Proposal for Delay of Public Building To Prevent Further Inflation

WASHINGTON, March 27.—A buyers' strike has been inaugurated in the construction industry and all industrial construction, all speculative house and apartment building and all public works except road building should be deferred at least until next fall, declares Gen. R. C. Marshall Jr., general manager of the Associated General Contractors of America. The contractors are said by Gen. Marshall to be in complete accord with Secretary of Commerce Hoover's recommendation to the President that public construction be delayed, to eliminate a competitive factor that is sending wages and materials to higher price levels, and to reserve work for slack periods.

"Approximately 11,000,000 persons are dependent for their livelihood upon the construction industry," states Gen. Marshall. "Because of high prices a buyers' strike already has set in and unless it is checked we are heading directly into a situation such as existed two years ago. Apparently the buyers' strike will be in full effect by fall. Our efforts now should be directed toward preserving the continuity of employment in the construction industry toward maintaining the stability of these 11,000,000 persons.

"Normally we do from $4,000,000,000 to $4,500,000,000 worth of construction in the United States in a year. Last year we did $5,000,000,000 worth. It appears that we will attempt to do more than $6,000,000,000 worth this year, and it cannot be done. The country has labor and material only for about $5,000,000,000 worth. With contractors and material makers bidding against each other for labor and supplies the cost of construction will be pushed up abnormally but the volume cannot possibly be enlarged. It should not be forgotten that for each 10 per cent increase in construction costs a permanent burden of $600,000,000 is saddled upon this generation. It is an added carrying charge that cannot be softened or eliminated.

"Owners and financing interests are largely responsible for the present situation. The latter get the largest percentage out of construction work, but the public consistently refuses to include them in the construction industry. The bonding and insurance on a building construction job runs to 7 per cent on the average, which is greater than the average profit of contractors. Owners are impelling contractors to get material and labor regardless of cost, which precipitates intra-industry bidding. Financial interests initiate projects regardless of cost, expecting to pass it along.

"Every man who can defer his construction to fall will not lose thereby. Material and labor costs should average lower then. Productivity, not wages, is the true measure of labor. In 1919-20, when conditions were somewhat similar to those of today, labor's efficiency dropped to 40 per cent of normal. Secretary Hoover's recommendation is a wise one. With labor and material limited in supply, we only enhance its price by all bidding for it instead of spreading our construction out over a period. It is more in the interests of the public than of the construction industry to look ahead.

"All industrial construction that is not imperatively needed should be delayed. All public construction, except road building, also should be held up. The speculative builder who builds a number of houses at a time should also withhold his efforts. The transportation situation is a factor, too. The railroads cannot carry materials for more than $5,000,000,000 worth of construction a year, regardless of how much is contracted for. Likewise, the labor supply is limited; we should have an immigration policy that would net 500,000 aliens annually. Neither labor nor the construction industry is to blame for rising prices; the increases are due wholly to the insistent bidding for a limited supply."

According to the cost-of-building index of the Associated General Contractors of America, based upon 1913 as 100, the cost of building has been rising steadily since April, 1922. In March and April last year the index was 165; by January, 1923, it had risen to 187 and the end was not yet in sight. In April, 1919, the index began to rise and by April, 1920, it had reached its peak for the 1919-20 boom. The present rise has been less precipitate, due to generally-lower levels, but the trend is quite parallel. The following table gives the Associated General Contractors' indexes for the cost of building and its two factors—wages and material prices—on a basis of 1913 equalling 100:

	Cost of building	Wages	Material prices
January	187	185	188
December, 1922	185	185	185
November	185	184	185
October	183	182	183
September	181	183	180
August	175	180	172
July	173	178	170
June	172	179	167
May	168	180	160
April	165	181	156
March	165	181	155
February	166	182	156
January	167	183	157
December, 1921	168	183	158
November	171	183	163
October	169	183	159
September	167	183	156
August	167	183	156
July	169	183	160
June	171	184	163
May	175	189	165
April	177	192	167
March	182	195	173
February	186	195	180
January	193	195	192

New Plant About Ready

St. Louis, March 27.—The new $1,500,000 sheet plant of the National Enameling & Stamping Co., at Granite City, Ill., will be ready for part operation early in April, and is expected to be entirely completed and in full service by the end of July. The company has added another open-hearth furnace to those in commission, and its general operations are as near capacity as labor and raw material supplies will permit.

Place Contracts for New Wire Mill Project

The G. F. Wright Steel & Wire Co., Worcester, Mass., has awarded contracts for a wire mill with a capacity of 10,000 tons annually, at an estimated cost of $350,000, including equipment. The company expects to be producing its own wire by next autumn. The main mill will be one-story, 150 x 300-foot and the cleaning mill will be of the same construction and height, 40 x 100-foot and 60 x 150-foot, respectively, all with monitor roofs. Ground was broken by the E. D. Ward Co., general contractor. The Eastern Bridge & Structural Co., Worcester, will fabricate and erect the steel. The company now is doing business in the former plant of the Standard Plunger Elevator Co., in the Jamesville section of Worcester.

Gulf States Earns More

The operating income of the Gulf States Steel Co., Birmingham, Ala., according to the pamphlet report now received, totaled $1,406,083 in 1922, compared with a deficit of $242,921 in the preceding year. Capital expenditures for the year amounted to $232,788. The company reports that the volume of business increased gradually after the first quarter of 1922. Departments idle during the depression were re-opened and output increased 100 per cent. Retiring directors were elected.

Steel & Tube Net Up

In its annual report of earnings for 1922 the Steel & Tube Co. of America shows a net income of $472,420, after taxes, interest and depreciation and other charges. This compares with a net loss of $2,571,352 in 1921. Before interest and depreciation net profit amounted to $4,005,062 in 1922 against $52,707 in 1921.

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1920 Should Be Remembered

IN THEIR eager search for an answer to the universal question of how long present good times are going to last, business men frequently lose sight of the weight of their own actions in the final balance of controlling factors. Painful memories of 1920 are still fresh. If the lessons then learned are applied this year, business will avoid many of the pitfalls and excesses which brought on the drastic reaction of three years ago.

Leading business forecasters now are attempting to measure the extent of the prosperity period. Their estimates for the peak of activities range from next fall to November of 1924. The average for the bulk of guesses by competent observers would place the peak at next spring. All authorities agree that the good times could be prolonged if undue inflation of prices, wages and credit can be avoided. Higher rediscount rates by the federal reserve board and a determined policy of the board to head off unhealthy inflation would be a most effective measure making for prolongation of active business and a more gentle eventual reaction.

But enlightened executives can do much in helping the ship of business maintain its equilibrium. To those who find themselves impelled to throw all restraint aside in their anxiety to recoup extended losses quickly and make hay while the sun shines, the following advice from Benjamin M. Anderson of the Chase National bank of New York is recommended. He says:

"The policy of the sound and prudent business men will be to take advantage of existing markets. But he will be well advised to operate with an unusually large margin of working capital. He will be unusually cautious in giving and taking credits. He will strive for quick turnover, even though this means modest profits. He will avoid long-time commitments. He will shun plant expansion. He will watch collections closely. Finally he will be very conservative in paying out dividends or in taking profits out of business. He will seek to conserve profits and enlarge surplus as a buffer against future shocks and against unforeseen contingencies which an unbalanced world economic situation may easily compel him to face."

Economic Sovereignty in Doubt

DECISION of New York state authorities to claim exclusively all the waterpower within the state and to deny federal jurisdiction by attacking the constitutionality of the federal waterpower act not only is a rebuff to the Pennsylvania authorities who are averse to being excluded from the benefits of Niagara river projects but also a wedge into the present form of national government.

In warning Gov. Smith of New York not to break down the co-operation between the states, Gov. Pinchot of Pennsylvania pointed out that while Pennsylvania was desirous of participating in the distribution of power from Niagara, New York would be more than compensated by drawing upon the waterpower possibilities of eastern Pennsylvania. New York's answer is that her waterpower is her own, not to be shared in by Pennsylvania or by the federal government.

This spirit of state supremacy has had many outcroppings of late in more or less virulent forms. West Virginia has sought to keep her natural gas within her borders. Minnesota has levied a tax upon iron ore. Pennsylvania has exploited her anthracite monopoly by imposing a tonnage tax. Were New York state's theory carried to its logical conclusion, Pennsylvania could retaliate by prohibiting shipments of its coal into New York.

A member of the President's cabinet warns that all of this revives the supposedly-abandoned confederation idea and seeks to make each state sovereign, at least economically. States more favored than others by gifts of nature will watch the New York action closely. The federal government will contest the New York assumption vigorously in

the courts. Generally speaking, the greatest good for the greatest number is the policy that should prevail.

Unfair Tactics Bring Rebuke

THOSE steamship interests seeking to bar the ships of the United States Steel Products Co. from the Panama canal because of a semblance of competition between the steamship and the railroad subsidiaries of the Steel corporation have been justly rebuked by the interstate commerce commission. The commission has reaffirmed its stand that the transportation links of the Steel corporation do not actively compete.

To safeguard the Panama canal, congress in 1912 laid down the rule that an interest operating a railroad in competition with traffic through the canal should not be permitted to use the canal for its water subsidiaries. Prompting this attitude was the fear that the transcontinental railroads would enter the steamship business, and by controlling intercoastal trade by rail and water would forestall the cheaper intercoastal transportation for which the canal was built.

To say that the Bessemer & Lake Erie, Elgin, Joliet & Eastern and Union railroads are active competitors of the Isthmian Steamship Lines of the Products company is the most transparent fiction. It requires a minute search to discern even that they are so laid out as to make possible a routine of traffic which the broadest application of the Panama canal act might inhibit. Whether the policy of permitting an industry to own and operate a railroad or a steamship line is equitable is not at point. The commission has exhibited good, common sense by adhering to its former decision.

Machine Tool Industry Revives

IN NO period since 1920 has trading in machine tools been as active or as diversified as in the quarter now drawing to a close. Reports from various industrial centers make it fairly safe to estimate that business in the first three months of this year will be almost as large as the total volume of 1921, and approximately one-half as large as for the entire year of 1922.

Owing to the general character of demand, this improvement is being experienced by a wide number of shops. It is estimated authoritatively that production is now about 50 per cent of normal capacity, or about 25 per cent of the country's full requirements. Buying by the railroads and automotive industries has stood out; nevertheless, there has been a relatively vast bulwark of small scattered business that can only be fully appreciated by taking into account the unusual amount of activity in the metalworking industries generally.

The present showing, in conjunction with the large amount of buying in prospect, particularly from the railroads, would indicate that the machine tool industry should have little difficulty this year in repeating the performance of 1922 by doubling its sales. At the same time it should approximate a maximum rate of output, considering the present lack of export business and the shortage of labor.

Brazil Offers New Opportunity

THE end of this month marks the closing of the Brazilian National Centennial Exposition which has been in full operation for the past seven months. This exposition, which has received comparatively little notice in the American press, in reality marks an epoch in the relations between the northern and southern continents. Many business men from the United States have taken advantage of the exposition to visit South America, and not only have found out a great deal about the country which they probably never would learned in any other way, but have met influential business representatives of Brazil and Argentina, and other South American countries and have established friendships which will probably mean more in future business relations than many years of negotiation by mail and cable.

The closing of the exposition calls attention once more to the extent and character of the Brazilian market. The area of Brazil is approximately 200,000 square miles larger than the United States. Its population of 25,000,000 is about 40 per cent colored and 25 per cent foreign, and nearly all of this whole population is concentrated within 50 miles of the coast. Northern Brazil produces 96 per cent of the country's rubber. Central Brazil produces tobacco, cocoa, and sugar. The southern part of Brazil is the industrial section where high elevation causes an equable climate. British manufacturers have a strong hold on the Brazilian machinery market. Cotton mill machinery at present is mostly of British manufacture. Sugar mill machinery, however, is now coming largely from the United States. Nearly all shoe machinery also comes from the United States. Exports from Brazil to the United States are far heavier than to any other country.

Unfortunately the exposition started under the shadow of misunderstanding and uneasiness among United States exporters concerning the rejection of merchandise at Rio de Janeiro in the latter part of 1921. This difficulty has now been satisfactorily adjusted, and nothing stands in the way of manufacturers who wish to take advantage of the good effect of the exposition and strengthen their hold on the desirable trade of the rapidly developing southern country.

Reserve Board's Action Awaited

Question of Duration of Business Expansion Will be Settled by Extent of Price Advance in Coming Months—Reserve Board May Check Credit Inflation by Higher Rediscount Rates—Output at 1920 Peak

BY JOHN W. HILL, FINANCIAL EDITOR

BUSINESS developments since the first of the year have come to a point where it is no longer possible to doubt the arrival of genuine good times. The uppermost question in the minds of business men just now involved the probable duration of prosperity. Basic factors seem clear enough that activities will be maintained for at least six months. What will come after that is not so plain.

The answer will be supplied partly by business men themselves and partly by the federal reserve board in their control over the credit situation. By the exercise of reasonable restraint in the matters of price advances, wage bidding, borrowing and credit extension, and buying, business men can aid greatly in lengthening out the prosperity period. There are many signs of a growing recognition of this fact. Prudent executives are not anxious to repeat the excesses of 1920. However, the anxiety to recoup prolonged losses, the relative credit ease, the labor shortage and the present broad demand for goods, are all factors tending to push costs and prices higher and higher.

The policy of the federal reserve board toward credit expansion will be a weighty influence in the business situation in the immediate future. Thus far the trade improvement has not been accompanied by credit inflation. Banks have financed their commercial borrowers without important resort to the reserve system. This is shown by the fact, that although trade activities are at record levels, total loans of the reserve banks are 70 per cent less than they were three years ago.

Because of the importance of the reserve system's policy upon business much interest has surrounded the meeting of federal reserve board with governors of the several regional banks this week. From expressions contained in the March review of the federal reserve's board's Bulletin, it is evident that the board sees no present cause for alarm. The review points out that in the last five months industrial production has increased 20 per cent and in the aggregate is now actually above 1920.

Moreover, the board's survey of conditions in every district uncovers no evidence of an accumulation of unsold stocks. It says that, "so far as available indications go to the increased demand for credit has risen from larger requirements for production and trade and not from speculation in inventories." Manifestly the situation is now healthy. The danger lies in the possibility of undue inflation of credit and prices from the present levels. The reserve authorities may decide to hold these tendencies in check.

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Long Time Trend of Wages	Aug. 3

The Barometer of Business

WEEKLY COMPARISON

	Last week	Week before	One mo. ago	One year ago	1913
Business failures	391	371	336	544	450
Cash ratio Fed. Res. System	75.7	75.4	75.8	78.4	...
Loan rate, 4-6 Mo. N. Y. per cent)	5-5¼	5-5¼	4¾	4½-4¾	6
Aver. 20 ind'l shares	$99.46	$99.66	$98.55	$84.01	$82.00
Aver. 20 rail shares	$88.57	$88.51	$89.88	$78.88	$113.00
Ave. 40 bonds	$77.14	$77.71	$78.80	$78.04	$93.00
Car loadings (week ended March 10)	905,219	917,898	853,289*	829,128	819,329
Bank debits 243 cities (000 omit'd)	$10,187,597	$9,293,613	$9,384,561	$8,987,497	.....

*1920.

FOREIGN EXCHANGE (Demand)

	Normal	March 26 (close)	Week before	Mo. ago	Yr. ago
Sterling	$4.86	$4.69	$4.69	$4.70	$4.38
Francs	19.3c	6.61c	6.46c	6.05c	9.03c
Lira	19.3c	4.90c	5.18c	4.80c	5.11c
Marks	23.8c	0.0048⅓c	0.0048c	0.0044c	0.31c

MONTHLY COMPARISON

	February	Month before	Year ago	Monthly average 1913
Dodge building awards in 27 states	$235,000,000	$217,365,000	$177,473,000	$71,450,000
Business failures:				
Number	1508	2126	2331	1336
Liabilities	$40,627,000	$44,210,000	$72,608,393	$22,723,000
Exports	$310,000,000	$339,000,000	$250,619,000	$207,000,000
Excess of gold imports	$6,983,647	$24,347,802	$27,000,000	*$630,716
Bureau of Labor Price Index	157	156	141	100
Bradstreet's Price Index	153.7	148.3	125	100
Economist's British Price Index	4402	4324	4259	2717
Cost of Living Index	†157.5	158.1	157.7	100.0
New incorporations	$700,708,000	$909,093,800	$91,404,000	$172,301,000
Railroad net earnings	†$60,654,000	$79,154,000	$29,486,000	$59,900,000

†January. *Monthly average export excess.

The Business Trend

March 29, 1923

TRADE TODAY, TOLD BY IRON TRADE REVIEW CHARTS

GENERAL SITUATION—Signs accumulate of a growing degree of prudence in business sentiment as warnings appear against undue inflation of credit and prices; trade activities continue imposing; peak levels attained and held in many important lines.

STEEL PRICES—Quotations still rising, but trade attitude is against too rapid upturn; Iron Trade Review composite now 72 per cent above 1913; 37 per cent over one year ago and 12.6 per cent higher than last December.

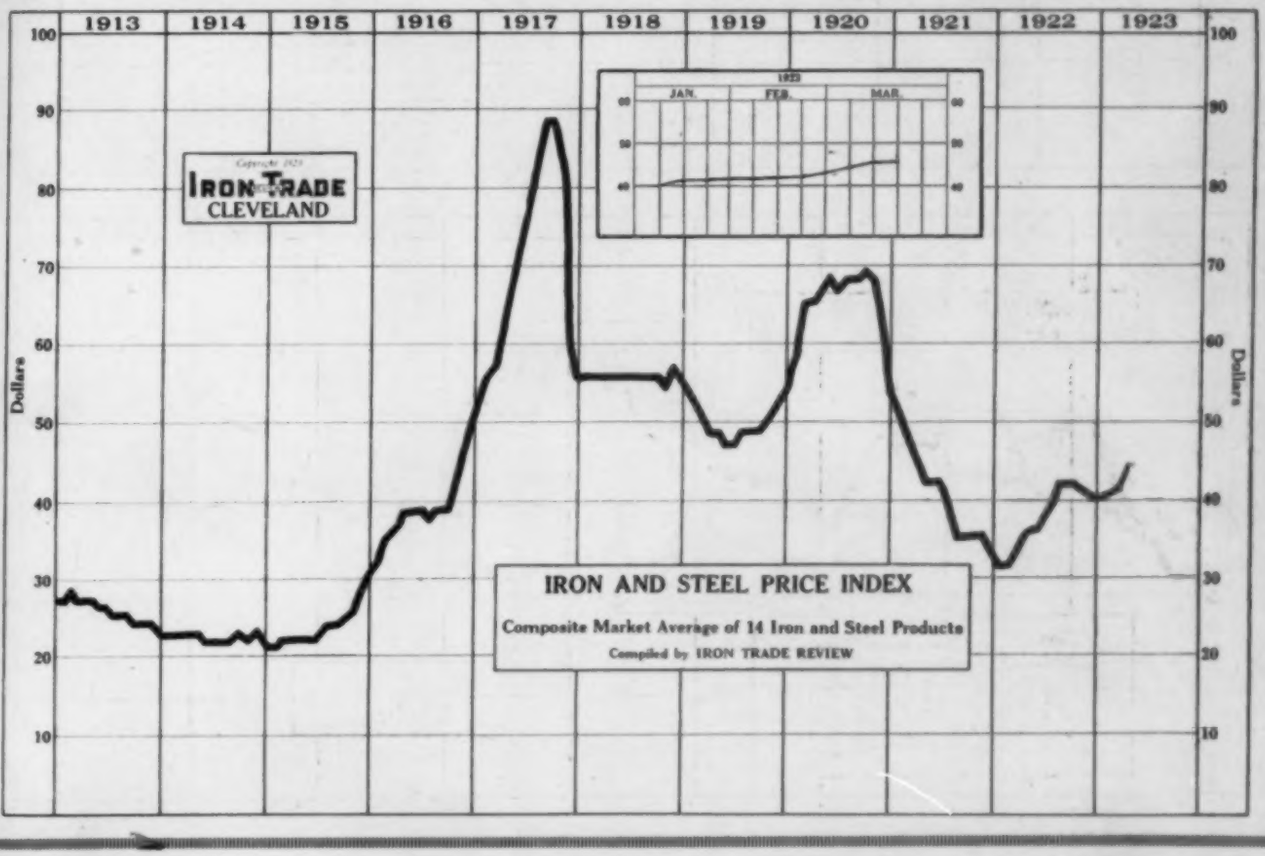
POWER CONSUMPTION — New chart shows consumption of electric power consumption by industries in United States; January reaches high mark.

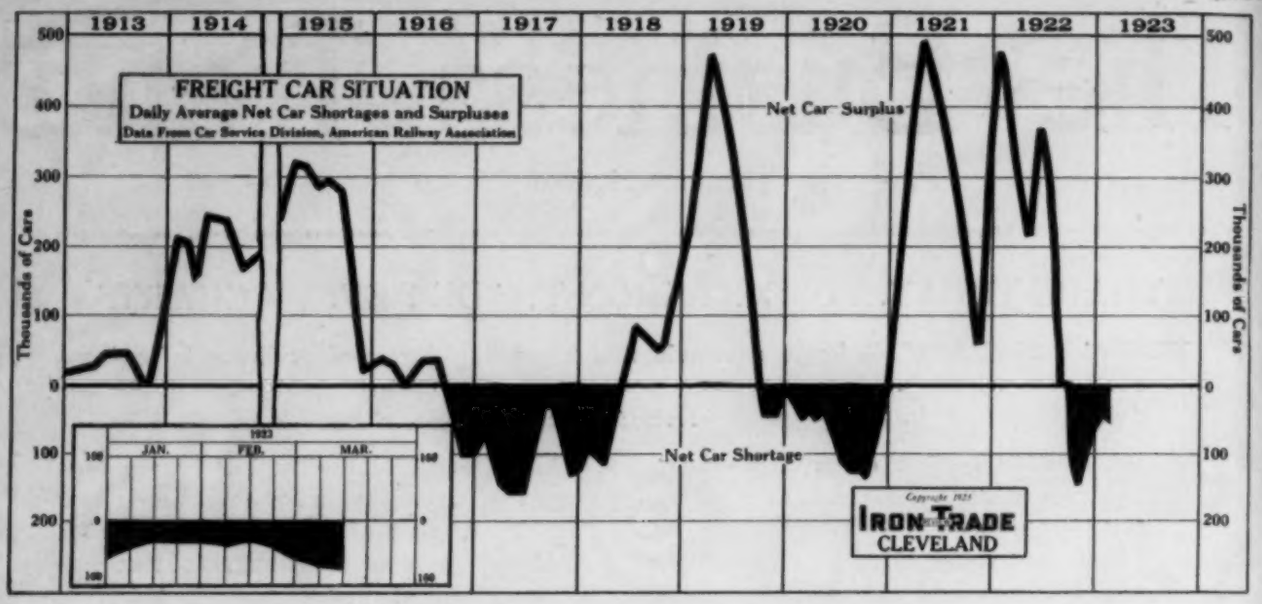
STRUCTURAL AWARDS—February bookings of fabricated structural steel were 80 per cent of capacity; this was highest point attained since May of 1922; compares with 43.5 per cent one year before.

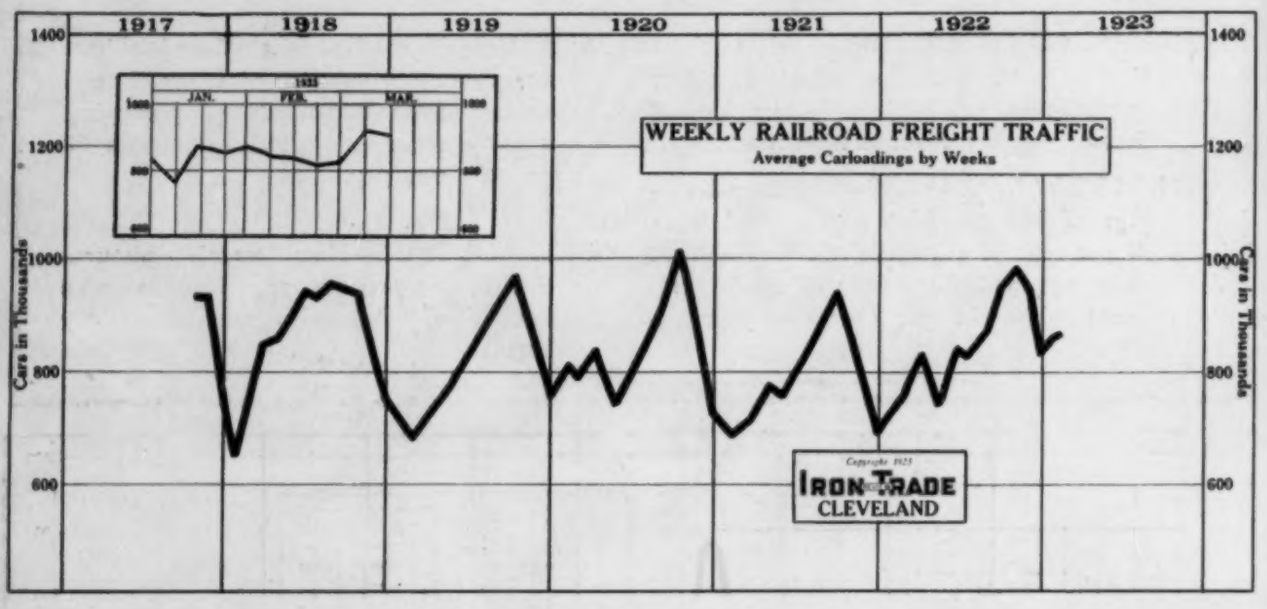
SHEET INDUSTRY—Total February output of sheets by independent mills was 89.0 per cent of capacity against sales of 94.7 per cent; in January output was 92 per cent of capacity.

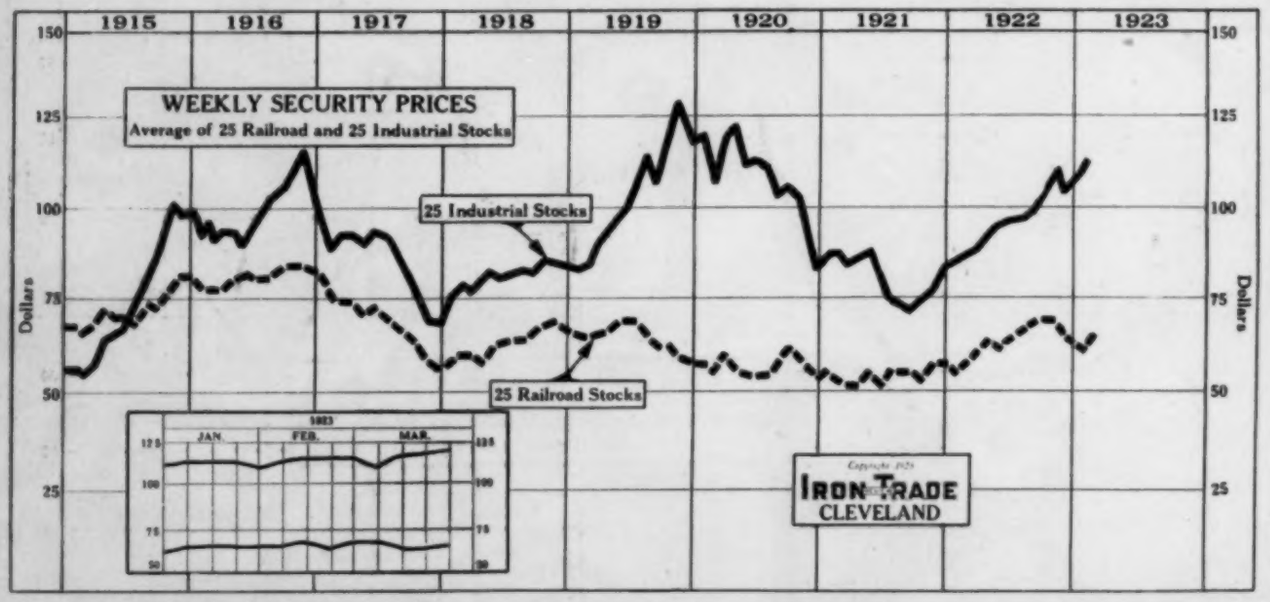
CASTINGS—New Business Trend Chart shows monthly sales of commercial steel castings from two-thirds of producing capacity of country; February sales 92 per cent capacity.

COKE OUTPUT—New graph pictures monthly by-product and beehive coke production; February record slightly down.




1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
FREIGHT CAR SITUATION
Daily Average Net Car Shortages and Surpluses
Data From Car Service Division, American Railway Association
Net Car Surplus
Net Car Shortage
Thousands of Cars
500
400
300
200
100
0
100
200
1923
JAN.
FEB.
MAR.
IRON TRADE
CLEVELAND


1917
1918
1919
1920
1921
1922
1923
WEEKLY RAILROAD FREIGHT TRAFFIC
Average Carloadings by Weeks
Cars in Thousands
1400
1200
1000
800
600
1923
JAN.
FEB.
MAR.
IRON TRADE
CLEVELAND


1915
1916
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1918
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1920
1921
1922
1923
WEEKLY SECURITY PRICES
Average of 25 Railroad and 25 Industrial Stocks
25 Industrial Stocks
25 Railroad Stocks
Dollars
150
125
100
75
50
25
1923
JAN.
FEB.
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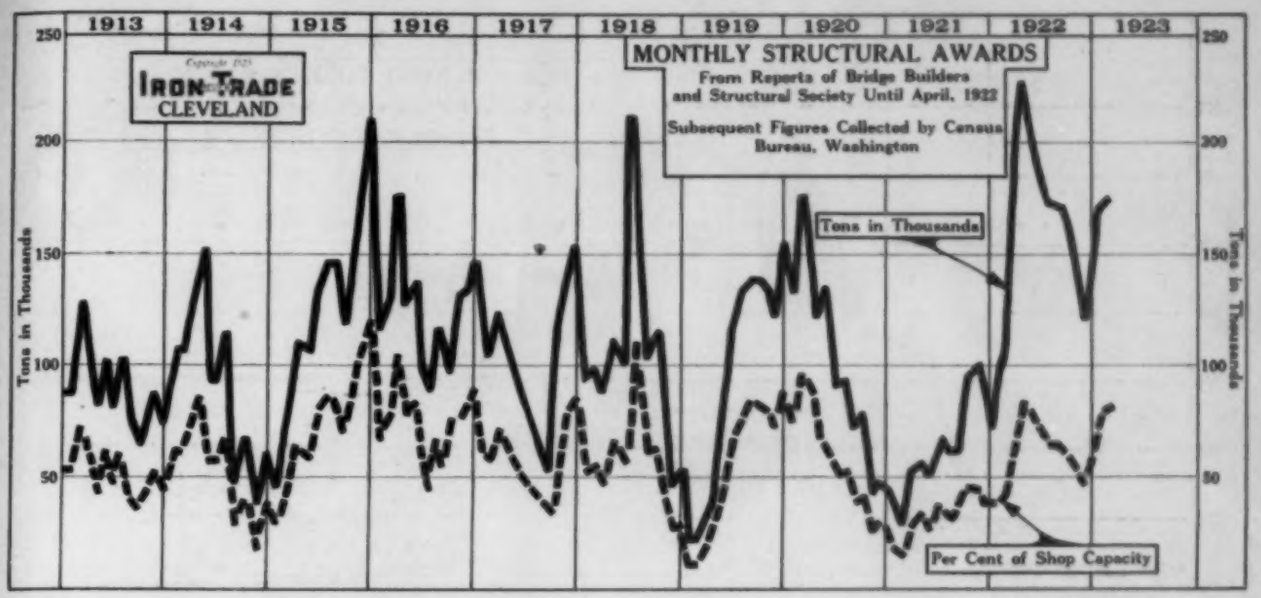
CLEVELAND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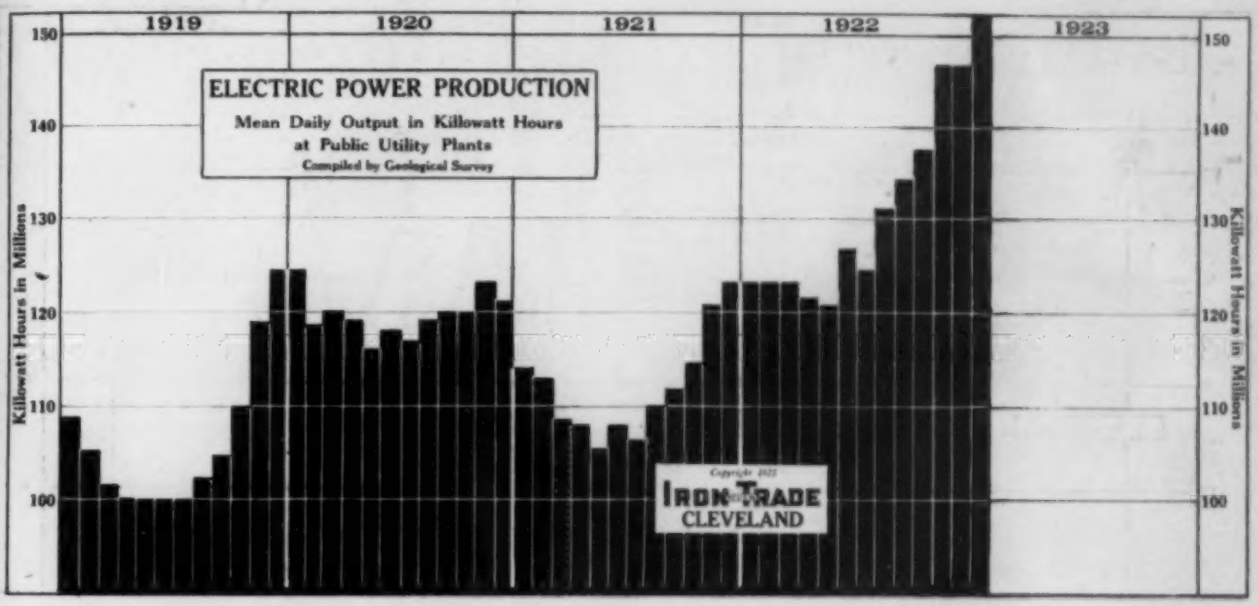
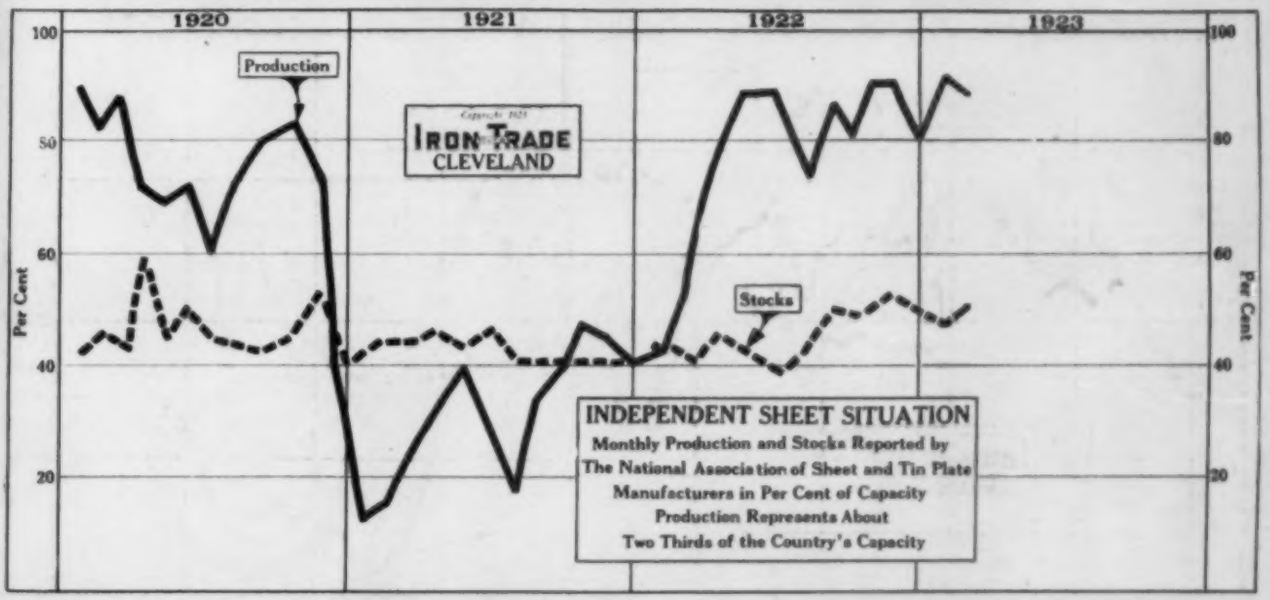
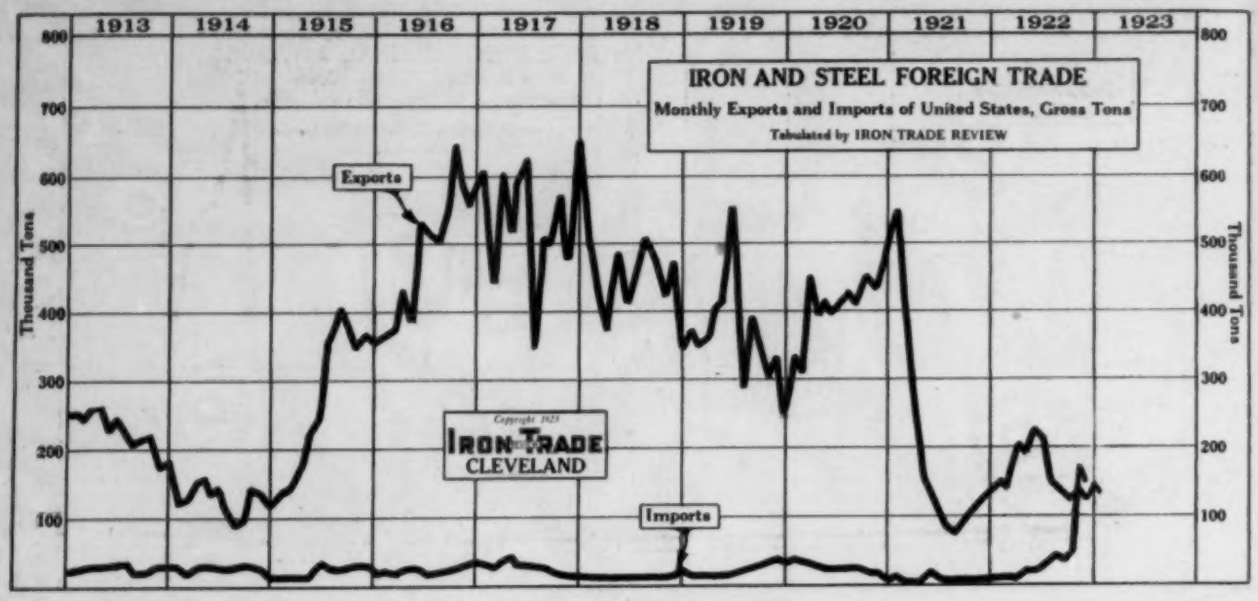
1922
1923
250
200
150
100
50
IRON TRADE
CLEVELAND
MONTHLY STRUCTURAL AWARDS
From Reports of Bridge Builders
and Structural Society Until April, 1922
Subsequent Figures Collected by Census
Bureau, Washington
Tons in Thousands
Tons in Thousands
Per Cent of Shop Capacity


1919
1920
1921
1922
1923
150
140
130
120
110
100
ELECTRIC POWER PRODUCTION
Mean Daily Output in Killowatt Hours
at Public Utility Plants
Compiled by Geological Survey
Killowatt Hours in Millions
Killowatt Hours in Millions
IRON TRADE
CLEVELAND


1920
1921
1922
1923
100
80
60
40
20
Production
Stocks
IRON TRADE
CLEVELAND
Per Cent
Per Cent
INDEPENDENT SHEET SITUATION
Monthly Production and Stocks Reported by
The National Association of Sheet and Tin Plate
Manufacturers in Per Cent of Capacity
Production Represents About
Two Thirds of the Country's Capacity


1913
1914
1915
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1918
1919
1920
1921
1922
1923
IRON AND STEEL FOREIGN TRADE
Monthly Exports and Imports of United States, Gross Tons
Tabulated by IRON TRADE REVIEW
Exports
Imports
Thousand Tons
800
700
600
500
400
300
200
100
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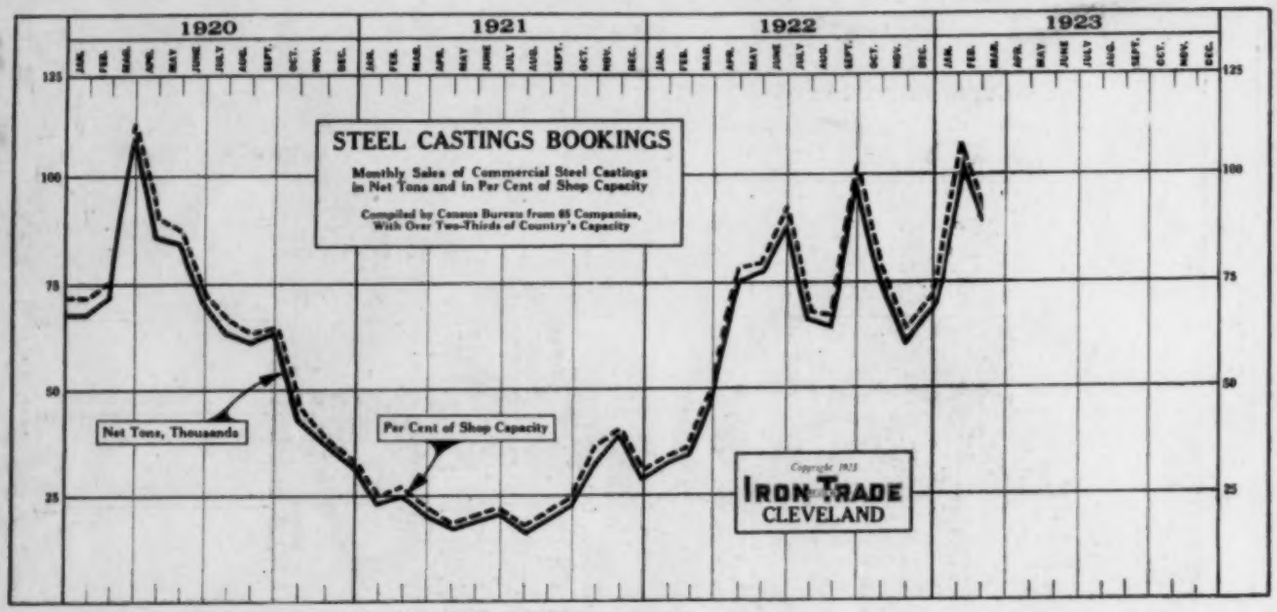
1920
1921
1922
1923
STEEL CASTINGS BOOKINGS
Monthly Sales of Commercial Steel Castings in Net Tons and in Per Cent of Shop Capacity
Compiled by Census Bureau from 65 Companies, With Over Two-Thirds of Country's Capacity
Net Tons, Thousands
Per Cent of Shop Capacity
125
100
75
50
25
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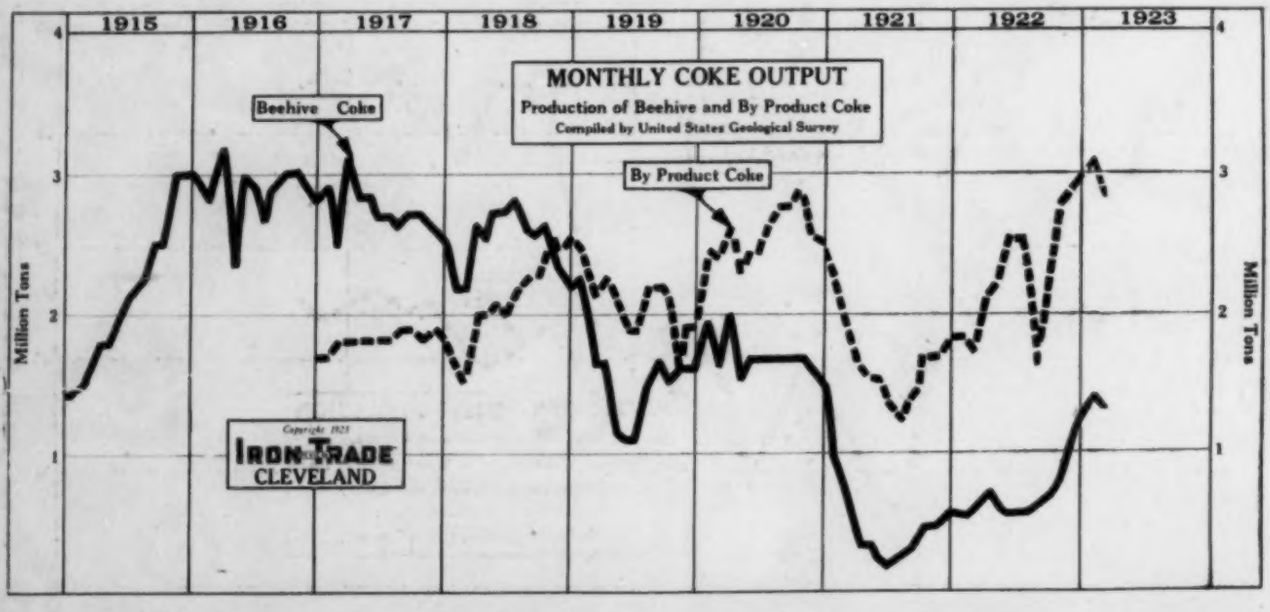
1915
1916
1917
1918
1919
1920
1921
1922
1923
MONTHLY COKE OUTPUT
Production of Beehive and By Product Coke
Compiled by United States Geological Survey
Beehive Coke
By Product Coke
Million Tons
4
3
2
1
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Burning Coke in Blast Furnaces

Combustion Zone in Several Stacks, Operating on Cokes Varying in Physical Characteristics, Explored by Water-Cooled Gas Sampling Tubes Driven into Hearth through Tuyeres—Coke Combustibility Not a Factor

BY G. ST. J. PERROTT AND S. P. KINNEY

CONSUMERS of metallurgical coke are agreed that the quality of their fuel plays an important part in the performance of the furnace. Less unanimous agreement is evident when the properties of a desirable coke are discussed or when consideration is made of suitable testing methods by which the worth of a coke for metallurgical purposes may be determined quantitatively. Much has been written of the importance of combustibility as a factor in determining the performance of coke in the blast furnace and it is generally believed that cokes vary widely in this respect. The usual operating data of the furnace afford little evidence as to the combustibility of the fuel.

As a part of a general investigation of the properties of metallurgical coke, the bureau of mines has explored the hearth combustion zone in a number of blast furnaces by means of water-cooled gas sampling tubes driven into the hearth through the tuyeres. The attempt has been made to determine the difference in combustibility of cokes varying widely in physical properties. Data have also been obtained in an experimental combustion furnace at the bureau laboratories in Pittsburgh. This paper gives the results of experiments, made at 11 blast furnaces, in which the composition of the gases was determined at various points in the hearth in the plane of the tuyeres. Further work is in progress in which the zone above the tuyeres will be explored.

Coke Size Affects Combustibility

H. A. Brassert has defined combustibility as the rate of progression of combustion, or, in other words, the speed at which the carbon molecules combine with oxygen under given conditions. He states that combustibility is governed by the size of the coke pieces, the physical and chemical composition of the carbonaceous material forming the cell walls, and the interior and surface structure of the coke pieces. A coke for blast furnace use must burn rapidly at the tuyeres and yet not be too vulnerable to the stack gases. A coke that is porous and light but with hard cell walls and surfaces will give best results; it will offer more carbon surface per unit weight to the oxygen of the blast than a denser, heavier coke and hence will be more combustible.

H. Koppers states that highly combustible coke may be made by carbonizing at temperatures between 550 and 800 degrees Cent. He believes that the ideal metallurgical coke should burn rapidly to carbon monoxide at the tuyeres and states that oxidation of metallic iron occurs in the combustion zone at the tuyeres, necessitating the consumption of carbon in the hearth for the reduction of the iron oxide so formed and tending to cool the hearth. Obviously, the net heat effect is identical whether iron is burned by air and carbon burned by iron oxide so formed, or carbon burned directly by air. A combustion zone of small extent is therefore desirable. Oxidation, or solution, of carbon in the stack is believed by Mr. Koppers to be desirable because the heat absorbed by this reaction tends to keep the coke cool and in its original highly combustible state until it reaches the tuyeres. He believes that the combustibility of coke is influenced by the amount of volatile matter it contains and, to some extent, by the porosity. Heating above 700 degrees Cent. reduces the oxygen and hydrogen content and produces a less combustible coke of higher true specific gravity.

E. R. Sutcliffe and Edgar C. Evans agree with Mr. Koppers as to the necessity for combustible coke in blast furnace operation but do not consider his method of carbonization below 800 degrees Cent., to be a satisfactory solution. They lay special stress on the importance of porosity and believe that a fuel containing interconnected pores is more combustible than one in which the pores are not connected.

Other workers have defined combustibility in terms of empirical laboratory tests, as for example, the relative weights of fuel oxidized in a given time when equal weights of various cokes are placed in an experimental furnace and burned by natural draft or by a measured forced draft. It is generally believed that a light porous coke will burn faster than a dense coke of low porosity, but opinions differ as to what constitutes faster burning. The statement often is made that the blast furnace travels faster with a free burning coke; often this means merely that a greater number of skip loads of a porous coke are used daily when dense coke is employed, a phenomenon quite independent of combustibility and explained simply on the basis of difference in apparent specific gravity. The implication often is made, however, that the weight of carbon burned per minute, under conditions where the volume of blast per minute is constant, increases with the coke combustibility.

Carbon Dioxide Primary Product

Various investigators have shown that the primary product of combustion in a fuel bed is carbon dioxide, which then reacts with the incandescent carbon to form carbon monoxide. The aim of burning fuel at the tuyeres in the blast furnace besides producing the necessary heat for the reactions, is to form bosh gas for reducing the ore in the stack. This bosh gas consists of carbon monoxide, nitrogen, and small amounts of hydrogen. Discussion must be limited to the combustion of that part of the fuel which actually reaches the tuyeres and is consumed by the blast, neglecting the variable amount oxidized by direct reduction or by premature combustion, for solution, in the stack gases.

It is essential that a clear definition of the term combustibility be made before the subject can be discussed intelligently. For our purposes the term must be considered from the standpoint of the blast furnace, a furnace in which air for combustion is supplied at a constant and high velocity, in which the temperature of the combustion zone is 1650-1800 degrees Cent. and in which, irrespective of the fuel employed, the final gases

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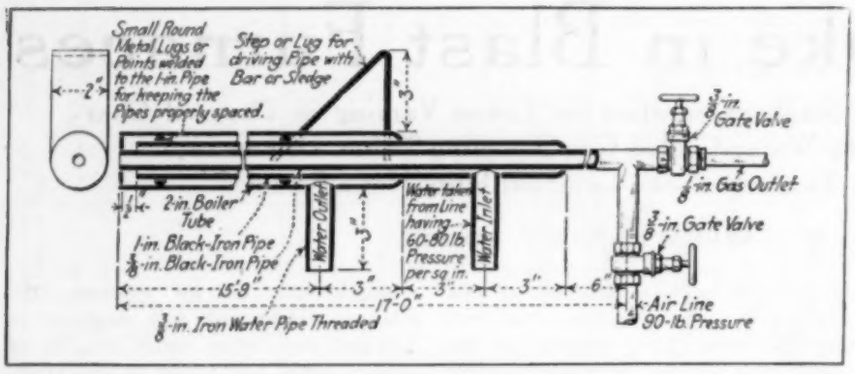

FIG. 1—CROSS SECTION OF WATER-COOLED GAS SAMPLING TUBE WHICH WAS DRIVEN INTO FURNACE HEARTH THROUGH THE TUYERES

of combustion contain carbon monoxide and only traces of carbon dioxide. Thus a given weight of blast will burn the same weight of carbon at the tuyeres, irrespective of the physical properties of the coke. Analogies drawn from combustion at low rates in hand-fired furnaces or from combustion tests in experimental furnaces burning the natural draft are apt to be misleading.

Combustibility Is Defined

In terms of blast furnace operation, we may, therefore, formulate the following measure of combustibility. The combustibility of fuel burned at the tuyeres is inversely proportional to the distance from the tuyeres at which oxygen and carbon dioxide have disappeared or, in other words, directly proportional to the space rate of disappearance of oxygen and carbon dioxide. As combustion takes place at the tuyeres in a zone of three dimensions, the term may be defined, assuming a tuyere of given dimensions and a given weight of air per minute, as the mean rate of gasification of fuel per unit volume of the combustion zone.

The extent to which combustion has proceeded at any point in a fuel bed may be expressed conveniently as the ratio between the percentage of carbon in the gases at that point and the maximum percentage the gases can hold, that is, when they consist of CO and N_2 only. From the equations

$$O_2+C=CO_2$$
$$CO_2+C=2\ CO_2$$

it appears that when combustion has proceeded completely to the formation of CO, the volume of CO appearing in the gases is equal to $2O_2$ Hence the expression

$$\frac{CO_2+CO}{2O_2}$$

where CO_2, CO, and O_2 are in molecules, represents the percentage saturation of the gases with carbon. From the gas analyses, this percentage may be determined as follows, where

$$20.9X\frac{N_2}{79.1}=$$

oxygen in unit volume of combustion gases:

$$\frac{CO_2+CO}{2\left(20.9X\frac{N_2}{79.1}\right)}X100$$

or

$$189X\frac{CO_2+CO}{N_2} \qquad (1)$$

where CO_2, and N_2 are in volume per cent.

If the blast is passing through a fuel bed of pure carbon, and hence all the oxygen appears in the gases, the expression

$$20.9X\frac{N_2}{79.1}$$

obviously is equal to $(O_2+CO_2+\frac{1}{2}CO)$ and equation (1) may be written

$$\frac{CO_2+CO}{2(O_2+CO_2)+CO}X100 \qquad (2)$$

in the blast-furnace hearth, the gases may contain a greater percentage of CO than could be obtained by burning carbon with air, due to the introduction of CO produced by direct reduction. Equation (1) will indicate this condition by values higher than 100 per cent if the gases contain little CO_2, and is to be preferred to equation (2) for our purposes. The hydrogen, oxygen, and nitrogen present in the fuel and the blast are assumed to be dry. Results are to be considered merely as approximate indications of the extent of combustion at any point.

Physical Properties and Combustibility

Before considering the experimental data on combustion in the blast-furnace hearth, obtained by the writers, certain conclusions may be made as to the probable effect of the physical properties of coke on its combustibility.

1. Combustibility of coke does not increase with decreasing apparent density or with increasing porosity. The extent of the zone of combustion, other factors being constant, depends on the total effective surface exposed to the blast per unit volume of coke. Neglecting the effect of porosity, the total surface per unit volume is independent of the apparent density of the coke. The total effective surface probably is independent of the number and size of the pores, over the range of porosity in ordinary metallurgical coke, because the voids between the separate coke pieces are so large, in comparison to the size of the pores, and the velocity of the blast of such magnitude that the percentage of the blast passing in and out of the

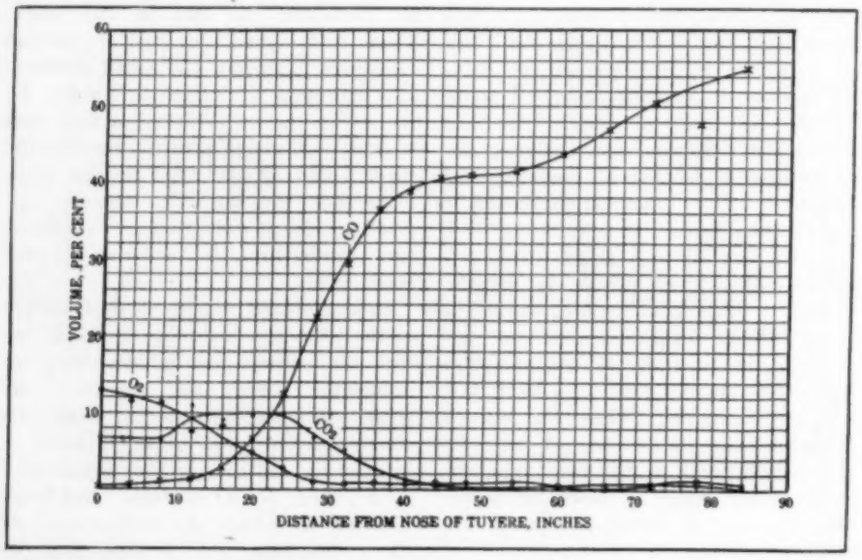

FIG. 2—CURVES OF AVERAGE HEARTH-GAS ANALYSIS VALUES FOR 10 FURNACES

pore depressions or passing through the coke pieces by way of connected pore spaces is infinitesimal.

Effect of Coke Density

P. H. Royster has suggested that a porous coke might be expected to be less combustible than a dense coke because combustion at the blast velocity obtaining in the furnace probably takes place on the exposed peaks of the cell walls, making a porous coke present less effective surface for combustion than a dense coke. In any event, it is obvious that the surface exposed per unit weight of coke is no measure of its combustibility because the exposed surface in a combustion zone of given dimensions is independent of apparent gravity *per se*, provided, of course, that the size of the coke pieces is constant. Differences in apparent density may have a certain mechanical effect, because for a given weight of carbon burned per minute, the number of pieces of coke falling into the combustion zone will increase as the apparent density decreases. Thus with a coke of low apparent density and the fuel in the combustion zone in a greater state of flux, the effective carbon surface exposed in unit volume of the combustion zone may be lower than when dense coke is employed. Again this would mean decreased combustibility as measured by the extent of the combustion zone at the tuyeres.

2. Combustibility probably increases within certain limits as the size of the coke pieces diminishes, because the smaller coke presents greater surface per unit volume to the impact of oxygen molecules of the blast. This is evidenced by the fact that diminishing the size of coke increases the pressure necessary to force a given amount of air through a fuel bed of given dimensions, the increased pressure being due to increased number of impacts of air molecules with the fuel. Practical operating considerations limit the range of sizes that may be employed successfully.

3. The rapidity of combustion may depend on the nature of the carbonaceous material composing the cell walls of the coke. J. K. Clements, L. H. Adams, and C. N. Haskins have shown that the rate of reduction of carbon dioxide by charcoal is considerably greater than the rate of reduction by coke over the temperature range 900-1100 degrees Cent. As the extent of the combustion zone is affected by the rate of oxidation of coke by carbon dioxide formed as the primary product of combustion, it is possible that the character of the carbonaceous material may, as Mr. Koppers believes, influence the rate of combustion. It must be remembered, however, that the temperature of the combustion zone at the tuyeres, namely 1650-1800 degrees Cent., is considerably higher than the range investigated by Messrs. Clements, Adams and Haskins. Differences in the rate of reduction of CO_2 by different forms of carbonaceous material may be considerably less at these high temperatures.

To sum up: The combustibility, or rate of gasification, or fuel per unit volume of the combustion zone does not increase with decreasing apparent density (considered apart from porosity), it probably does not increase with increasing porosity, but probably increases to some extent as the size of the coke pieces diminishes, and may depend on the nature of the carbonaceous material.

Historical Information on Combustion

Beginning with Bunsen in 1843, a number of investigators have endeavored to explain the chemical reactions taking place in the blast furnace by analyzing the gases at different levels. Peter Tunner, in 1860, concluded that combustion at the tuyeres extends in the direction of the air current to a distance of 1½ feet, the hottest part of the focus, about 6 inches in extent, being in the middle. The space of combustion extends upwards about one foot. Increased pressure, increased blast velocity, or change of tuyere dimensions only slightly modifies the extension of the space combustion.

Notes Disappearance of Oxygen

In 1893, W. Van Vloten published the results of a series of experiments in which gas samples were taken by means of a water-cooled sampling tube, both through the tuyere and through a hole 25 inches above the tuyere. He found that oxygen had disappeared 24 inches from the tuyere, that CO_2 had disappeared 40 inches from the tuyere, and that none of the samples taken 25 inches above the tuyere contained any oxygen. His results showed considerable deficiency of oxygen in the vicinity of the tuyeres, which he concluded was caused by the burning of other elements than carbon, namely, silicon, manganese, iron, and phosphorus. He divides the hearth into an oxidizing zone of small extent around the tuyeres where oxygen and carbon monoxide are present, and a reducing zone where only carbon monoxide is present.

In 1911, M. Levin and H. Neidt and, in 1913, Norbert Metz conducted an extensive series of experiments in which gas samples were taken for several months at different levels in the furnace. At 1.2 feet above the tuyeres, Messrs. Levin and Niedt found no oxygen, only a trace of carbon dioxide, and about 43 per cent of carbon monoxide. Norbert Metz had no sampling hole nearer the tuyeres than 5.5 feet. The gases here contained no oxygen, traces of carbon dioxide, and about 42 per cent carbon monoxide. The conclusion to be drawn from the work of previous investigators is that combustion at the tuyeres is rapid and that the area of the combustion zone where oxygen and carbon dioxide are present is of

Table I

Source and Properties of Coke Used in Tests

Furnace	Type of oven	Coking time, hours	Coal seam	Moisture, per cent	Volatile matter, per cent	Fixed carbon, per cent	Ash, per cent	Sulphur per cent	Shatter test,* per cent	True specific gravity	Apparent specific gravity	Porosity, per cent
Alabama 1	SS	18	Brookwood and Milldale	2.5	1.4	85.6	10.5	0.9	69	2.00	0.99	51
2	SS	20	Mary Lee	3.0	1.1	82.4	13.5	0.8	69	1.96	1.00	49
3	K	19	Pratt	3.6	1.1	87.3	8.0	1.1	70	2.04	1.14	44
4	BH	72	Pratt	0.5	1.0	87.2	11.3	1.3	64	2.13	1.15	46
5	BH	72	Pratt	0.5	1.0	86.8	11.7	1.1	66	2.08	1.13	46
6	K	19	Pratt	3.5	1.1	87.5	7.9	1.1	70	2.01	1.13	44
Penna. 1	BH	72	Pittsburgh	2.0	1.6	84.7	11.7	0.8	66	1.89	1.02	46
2	K	16	20 per cent Pocahontas, 80 per cent Pittsburgh	2.0	1.4	85.8	10.8	0.9	..	1.95	0.96	51
3	BH	48	Pittsburgh	2.0	1.1	82.7	14.2	1.1	67	1.90	0.98	48
4	K	20	10 per cent Pocahontas, 90 per cent Pittsburgh	4.7	1.7	81.3	12.3	1.1	..	1.99	1.04	48
Illinois	R	15	No. 7 Illinois	5.1	1.4	82.3	11.3	0.9	42	1.84	0.87	53

SS, Semet-Solvay by-product ovens. K, Koppers by-product ovens
R, Roberts by-product ovens. BH, beehive ovens.
*Per cent of coke remaining on 2-inch square mesh screen, after 50-pound sample has been dropped four times from a height of 6 feet upon a steel plate.

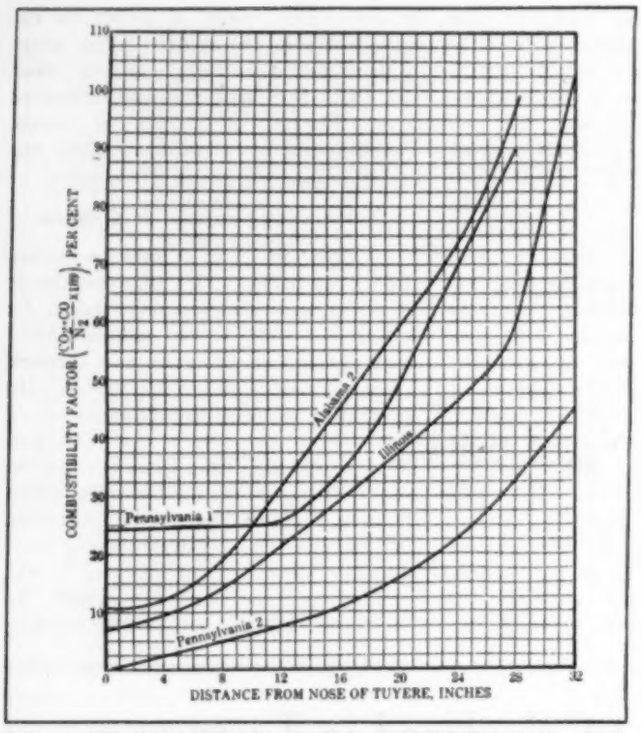

FIG. 3—PERCENTAGE TO WHICH COMBUSTION IS COMPLETE AT DIFFERENT POINTS IN BLAST FURNACE HEARTH

small extent compared to the total area of the hearth.

In the present investigation, gas samples have been secured at various points in the hearth in the plane of the tuyeres. Data have been secured at six blast furnaces in the Birmingham district and at five northern furnaces. In the procedure finally adopted, a water-cooled sampling tube, Fig. 1, is introduced into the hearth through a hole in the tuyere cap. The outer tube is 2-inch boiler tubing and the central gas-sampling tube is of ⅜-inch black pipe. By hammering with a dolly, the pipe is driven to the center of the furnace. Compressed air is blown through the ⅜-inch tube while the pipe is being driven into the furnace to prevent stoppage of the tube with slag or coke. When the pipe has been driven in a sufficient distance, the air line is disconnected and the sampling begun.

As the gas comes out under considerable pressure, sampling is relatively simple. Samples are collected by displacement over mercury in 4-ounce, wide-mouth bottles, which are closed with a rubber stopper after the sample is taken. A small amount of mercury is left in the bottles and they are stored stopper down until analyzed, the mercury covering the stopper and preventing solution of the gases in the rubber. Samples are collected at points 6 inches apart, from the center of the hearth to a distance of 4 feet from the tuyere, when they are collected every 4 inches. Analyses were made in a modified Orsat apparatus of the Burrell type. Two pipettes of the bubbling type containing acid cuprous-chloride solution were used for the determination of carbon monoxide. Hydrogen was determined in a slow-combustion pipette. Cuprous-chloride solutions were removed as soon as any trace of carbon dioxide appeared after combustion. Check analyses were made, from time to time, by the bureau laboratory in Pittsburgh. In these latter analyses, carbon monoxide and hydrogen were determined by combustion over copper oxide, and the methane was determined by slow combustion. No methane was found either in the hearth-gas or the stack-gas samples. While small amounts of methane might be expected in the stack gas of a furnace operating on high-volatile coke, it is probable that the methane reported in many published analyses is really carbon monoxide that escaped absorption in the cuprous-chloride solutions. It is essential that two cuprous-chloride pipettes be employed and solutions be renewed frequently.

Southern Data Incomplete

The investigation was begun in the Birmingham district and data at many of the southern furnaces are somewhat meager because of the mechanical difficulties at first experienced in obtaining samples. A considerable number of tubes were melted before the final design and procedure were developed. One of the most troublesome difficulties experienced was the stoppage of the gas line with slag. At times, several hours were taken in getting a few samples because just as soon as sampling was started the gas line became plugged with slag, necessitating removal of the pipe from the furnace and removing the obstruction from the pipe by a drill. This trouble was experienced when the nose of the pipe was in the region from 1 to 3 feet from the tuyeres, rarely in the inner part of the hearth or close to the tuyeres. The pipe can be pushed in easily 24 to 32 inches from the nose of the tuyere, the distance varying with the furnace, at which point it hits a fairly solid obstruction and must be driven farther with a dolly.

Operating data were collected for the 11 furnaces. With the exception of the stack-gas analyses, these were taken from the records of the companies; stack-gas analyses were made by the writers. Table 1 gives chemical analysis and physical properties of the cokes used as fuel by the different furnaces. These determinations were made at the bureau laboratories on samples of coke secured by the writers during the hearth-gas sampling.

In Fig. 2 are curves of the average hearth-gas analysis values for 10 furnaces. Pennsylvania No. 2 has not been included in this average because its curve was of different character from the other furnaces. In Fig. 3, the combustibility factor, equation (1), at different points in the hearth has been plotted for several furnaces.

The information collected shows that combustion in the hearth is rapid, the oxygen diminishing to practically zero at 24 to 30 inches from the tuyeres and carbon dioxide practically disappearing at 32 to 40 inches. In other words, the oxygen of the blast has completed its work of gasifying carbon at about 3 feet from the tuyeres. In the remainder of the hearth, the gases are inert in so far as the coke is concerned and consumption of fuel can take place only by means of oxygen from some other source than the blast. The occurrence of such oxidation will be evidenced by a ratio of total oxygen to nitrogen greater than that in atmospheric air.

Oxygen deficiency is apparent about 32 inches from the tuyeres, after which point an increasing excess of oxygen is evident. The deficiency, as previously pointed out, probably is caused by oxidation of iron at the tuyeres. The excess ratio of oxygen to nitrogen that appears in the central regions of the hearth indicates direct reduction of silica, or manganese or iron oxides. No conclusions can be drawn as to the amount of this direct reduction, because no data are at hand as to the percentage of the blast gases passing through a given point. Single analyses often show 80 per cent and more carbon monoxide; in such cases, the end of the sampling tube must have been in a region where only a small percentage of the blast gases was passing through.

The first combustion at the tuyere apparently is the burning of hearth gas swept into the blast as it leaves

the tuyeres. This is shown by the fact that a large percentage of carbon dioxide is present at the nose of the tuyere. The percentage of carbon dioxide near the tuyere, in general, is higher with furnaces using a large amount of coke per ton of metal than with furnaces operating on low consumption.

Data Are Compared

In Table II, certain points on the curves of hearth-gas compositions have been set down for comparison. The column "velocity of blast" gives the calculated wind velocity as the blast leaves the tuyere. In making the calculations, it was necessary to assume that pressure and temperature are those recorded as blast pressure and temperature in the operating data.

The writers have been unable to find a relation between the character of the coke employed at the various furnaces and the extent of the combustion zone. For example, comparison of data for the furnace operating on Illinois coke and the two furnaces operating on Connellsville beehive coke, namely Pennsylvania Nos. 1 and 3, does not show the differences that might be expected. The Illinois coke is light, porous, and highly combustible, in the generally accepted sense of the term, while the Connellsville coke is dense and apparently less combustible; but under blast furnace conditions, Connellsville coke is as combustible as the Illinois coke, for in the furnaces operating on Connellsville coke, oxygen has diminished to 2 per cent at 23 and 30 inches from the nose of the tuyeres, respectively; while in the Illinois furnace the distance is 28 inches. Carbon dioxide has diminished to 2 per cent at 30 and 40 inches for the Connellsville coke, and 40 inches for the Illinois coke.

The combustion zone of Pennsylvania No. 2 is somewhat different from that of other furnaces, but it is difficult to know whether to attribute this difference to the character of the coke or to a peculiarity of the furnace operation. No carbon dioxide is in evidence at the nose of the tuyeres and oxygen has not diminished to 2 per cent until 36 inches from the tuyere. The furnace was using a by-product coke similar to that employed at Pennsylvania No. 4. The operation at Pennsylvania No. 2 differs from that at Pennsylvania No. 4 in that the coke consumptions is considerably lower and the blast velocity higher.

If the four Pennsylvania furnaces and the Illinois furnaces are compared without reference to the southern furnaces, the rate of disappearance of oxygen would seem to be proportional to the velocity of the blast at the tuyeres. Since it has been shown by Mr. Kreisinger that the rate of disappearances of oxygen in a fuel bed varies little with the velocity of the blast, this phenomenon might be explained as caused by the mechanical action of the blast in keeping coke away from the tuyeres or in making a less concentrated fuel bed near the tuyere—with increasing velocity of the blast.

It was evident, during the experimental work at Pennsylvania No. 2, that an open condition existed in the vicinity of the tuyeres, because it was necessary to hold the sampling tube in place to prevent its being blown out by the blast pressure, when the end of the tube was 30 inches or less from the nose of the tuyere. This was also the case, to a smaller extent, with the other northern furnaces, but at the southern furnaces and Pennsylvania No. 1, operating on spiegeleisen, it was unnecessary to hold the tube in place, perhaps because the fuel was packed more densely around the pipe. Evidently this phenomenon is dependent also on the ratio of ore to coke.

From the data it is evident that, at distances greater than 28 to 40 inches from the tuyeres, the gas samples were taken from regions through which only a part of the blast gases was passing. This is evidenced by the increasing excess ratio of oxygen to nitrogen and the enormously rapid rise of carbon monoxide. An indication of the extent of the zone in which coke is being consumed rapidly is obtained while driving the sampling tube into the furnace. In the average southern furnace and in Pennsylvania No. 1, the pipe could be pushed in easily for 24 inches from the tuyeres. At Pennsylvania No. 2, it was possible to push in the pipe to 32 to 36 inches, and at Pennsylvania Nos. 3 and 4 and Illinois about 32 inches. At the point at which the pipe must be driven in by the blows of a dolly, it is evidently in contact with a fairly solid bed of coke, which is not being consumed rapidly.

Investigations Agree Closely

The data of Van Vloten taken in a plane 2 feet above the tuyeres show the highest percentage of CO_2 and lowest percentage of CO at a horizontal distance of 12 inches from a point on this plane directly above the nose of the tuyere. This would indicate that the blast began to pass upward rapidly at this point. The percentage of CO on this plane is considerably higher at points nearer the hearth wall. Van Vloten's data do not indicate much greater penetration of CO_2 in a veritical direction from the tuyeres than in a fiorizontal direction. His data taken at the tuyere plane agree closely with the results obtained by the writers.

It seems desirable to secure further

TABLE II

Summary of Blast Furnace Combustion Zone Data

Furnace		Coke				Combustion-Zone Data						
							Oxygen			Carbon dioxide	Carbon monoxide	
		Operation	Pounds per ton of iron	Porosity, per cent	Iron made per day, tons	Velocity of blast at tuyeres, feet per second	Nose of tuyere, per cent	4 inches from tuyere, per cent	10 inches from tuyere, per cent	2 per cent at distance from tuyere, inches	2 per cent at distance from tuyere, inches	2 per cent distance from tuyere, inches	Maximum, per cent
Alabama	1	Semet Solvay	3160	51	258	340	...	...	14.0	28	48	24	36
	2	Semet Solvay	2800	49	260	345	15.0	15.0	10.0	22	32*	12	61
	3	Koppers	1900	44	418	290	...	...	8.0	24	36	17	56
	4	Beehive	2645	46	355	365	8.0	8.5	8.5	24	43	22	44
	5	Beehive	2765	46	356	340	12.5	12.0	11.0	24	30	20	43
	6	Koppers	2750	44	476	505	...	...	...	(26)	35	..	52
Pennsylvania	1	Beehive	2800	46	220	235	8.0	8.5	9.0	23	30	12	56
	2	Koppers	1700	51	575	380	20.9	19.6	17.0	36	42	22	63
	3	Beehive	2465	48	449	290	14.0	10.5	8.0	30	40	6	45
	4	Koppers	2300	48	514	305	17.5	15.0	11.0	28	36	14	55
Illinois		Roberts	1770	53	515	280	17.0	14.5	10.6	28	40	6	49
Average							13.0	12.0	10.0	26	38	14	55

*3.5 per cent.

data above the tuyere plane, as our present samples at distances greater than 30 to 36 inches from the tuyeres were probably taken in regions through which the main stream of the blast gases was not passing Arrangements have been made to carry out this investigation at a blast furnace near Pittsburgh.

Combustibility of coke, from the standpoint of its use as blast furnace fuel, is proportional to the mean rate of gasification per unit volume of the combustion zone. The rate of gasification, other factors being constant, is inversely proportional to the volume of the zone around the tuyeres in which oxygen or carbon dioxide are present. At the wind velocities and temperatures prevailing in the combustion zone of the blast furnace, it is doubtful whether ordinary metallurgical cokes vary sufficiently in apparent density, porosity, or character of carbonaceous material to influence to any degree the extent of the combustion zone.

Analyses of samples of gas taken in the tuyere plane at various points in the hearth at 10 blast furnaces show that oxygen has diminished to practically zero at 24 to 30 inches from the tuyeres and carbon dioxide has practically disappeared at 32 to 40 inches. The gas analyses indicate that direct reduction of metallic oxides is taking place in the central regions of the hearth. Some difference in the character of the combustion zone at the several furnaces is evident but no relation is apparent between these differences and the physical properties of the coke. It seems probable that the large differences observed in blast furnace operation with different cokes are caused by other factors than the relative combustibility of the cokes in the tuyere zone.

This investigation was made under the supervision of A. C. Fieldner, supervising fuels chemist. The writers' acknowledge their indebtedness to F. H. Royster, assistant metallurgist, Minneapolis station, who suggested the problem and gave helpful advice and criticism during the course of the work, and to the superintendents and other officials at the blast furnaces, whose co-operation made the investigation possible.

Protecting Workmen's Eyes Important

BY BUELL W. NUTT

OF ALL the nonfatal accidents which occur in industry, eye accidents are among the most numerous and most costly of all. It is estimated that at least 20 per cent of all these nonfatal accidents are eye accidents, and that of the eye accidents, probably 28 per cent result in the loss of one eye and 10 per cent in the loss of both eyes, while many of these accidents impair the vision to a lesser or greater degree, cause a great deal of suffering, result in much lost time, and are a very great expense to the employer, and often to the community. The sad part of all this is that eye accidents, of all accidents, are probably the easiest to prevent, and it is conservatively estimated that at least 95 per cent of them can be eliminated by the use of proper goggles, or by the use of various types of masks, hoods, and helmets.

In visiting hundreds of plants during the past six years the author has found that while at first it was sometimes difficult to convince an employer to provide goggles for his employes, most employers now do not hesitate to buy goggles. The greatest problem with them today seems to be the question of how to get the men to wear the goggles after they have been supplied. A great many workmen in all kinds of plants interviewed in an endeavor to find out why they do not want to wear goggles, and their objections have been sifted down to about three general complaints as follows:

1. They are afraid that the glass may be broken and driven into their eyes.

2. They complain that goggles are uncomfortable and hurt their noses, cheeks and ears.

3. They complain that goggles give them headaches or prevent them from seeing properly.

In considering these complaints; first we have fear of broken lenses. No workman now need be afraid to wear goggles of the better or standard grades, because the frames are substantially made and the lenses used are especially ground to withstand heavy blows without breaking. Two general types of lenses are used for chipping and grinding goggles; one an optical glass which is ground, polished and especially annealed which makes it a great deal stronger than ordinary glass, and the second type a lens constructed of two separate sheets of glass between which a sheet of celluloid is placed, the three being welded together into one solid lens. A lens of this character even when cracked by a heavy blow will not separate. Therefore, if workmen are provided with goggles of a standard make, they may be assured that they will have no trouble from broken glass being driven into the eye with the resultant loss of vision.

Claim Goggles Uncomfortable

Second, we have the complaint of discomfort, and in the author's judgment this is the greatest obstacle of all to the wearing of goggles. We cannot expect men to wear goggles that are uncomfortable and which hurt their noses, cheeks or ears. To eliminate this complaint the right type of goggles must be selected for the particular work in hand. For grinders, chippers and similar operators the spectacle form of goggles fitted with side screens is the best. It also is best to select one which readily may be adjusted, so that it may be easily fitted to the contour of the nose, cheek and face. No two faces are just alike, and to make goggles comfortable care must be exercised to see that they are properly fitted. Adjusting the nose piece or temples usually will change an uncomfortable goggle to a comfortable one, and one which workmen will wear without complaint. It is good practice to have one man in each plant who has had some instructions in the use and care of goggles supervise their distribution. He can see that each man is properly fitted and can look after the repairs and sterilization.

Third, we have the complaint that goggles cause headaches and prevent clear vision. The headache part of this complaint frequently is due to the poor adjustment which causes undue pressure on the nose or cheeks. Proper adjustment will overcome this. Sometimes men also will tell you that they cannot see plainly when wearing goggles. As a matter of fact the lenses in the better grade goggles never obscure vision and will neither add to, or detract from a man's vision—the chances are that the man who makes this complaint has defective eyesight. A man who has poor vision is not always a safe man to have around a plant, neither is he efficient. Eye strain produces fatigue, dizziness, headaches ,and causes a slowing up of the worker, as he cannot see his work properly. It also results in a drain of nervous energy with the result that the functions of other parts of the body must suffer in consequence, and there-

From a paper presented at the convention of the American Foundrymen's association held at Rochester, N. Y. The author is connected with the Safety Equipment Service Co., Cleveland.

by lower the vitality and efficiency. After the age of 35 to 40 years, the near-point vision begins to dim, and when this has started the only way to overcome it is to have lenses fitted, which, in a sense, restores the vision to its former keenness. In those below 35 years of age other defects of vision may occur which may be corrected just as easily by proper lenses. To give a man goggles fitted with plain glass and expect him to use them, regardless of the fact that he may have poor vision, many times places him under a handicap. Many complaints that goggles cause headaches, dim vision or that they hurt the eyes can be traced to this source.

Loss of One Eye

Man is equipped with what is known as binocular vision; that is, he uses both eyes at the same time, to look at the same object, and by this method is enabled more accurately to tell direction and judge distance and the size of objects. The loss of an eye, therefore, upsets the whole scheme of his vision, and as a result he not only loses 50 per cent of his sight, but far more, as the remaining eye cannot function properly by itself. Therefore the ability to judge direction and distance correctly is largely lost to the individual with only one eye. Thus, too, many people who have normal vision in one eye and defective vision in the other are not aware of the fact, and frequently poor vision in both eyes is not detected. Such employes are a source of danger, not only to themselves, but to their fellow workmen. It pays to know that men in your employ have good eyesight, and it pays to provide goggles fitted with corrective lenses when you find a workman suffering from poor vision, because improved vision not only makes a more proficient worker, but it often overcomes the objection to wearing goggles. A man's vision easily may be determined by means of a simple chart which can be used by any clerk in the employment department.

Lenses Should Be Colored

Certain kinds of work exposes the eyes of workers to intense heat and light. Welders, metal pourers, furnace men and others, therefore, must be provided with goggles or masks containing specially colored lenses to keep out the dangerous rays of light which are present in all forms of artificial as well as natural light.

For sand blasting and other dusty operations hoods of various styles are available which keep out dust, dirt or sand. Likewise respirators and gas masks of various types should be provided for men subject to dust, fumes, gas or smoke. Giving a little thought to the proper selection of the type of eye protection required and some personal attention in seeing that men are properly fitted usually will solve the problems of eye protection.

The question of safe clothing in the foundry means first the elimination as far as possible of thin, ragged, greasy, loose, and baggy clothing, and worn-out or laced shoes. Men should be urged to wear the one-piece suit where possible, as it eliminates much of the hazard from loose, ragged clothing. Fire-proofed duck suits of the one-piece variety make the safest and most practical suits to use. They will shed sparks and small spatters of metal and will not burn readily. Asbestos suits also can be secured, and are sometimes necessary. Safety shoes are also essential and at any rate the use of lace shoes should be prohibited. The proper leggings also should be provided to prevent the burning of legs and feet. There are numerous types of leggings which are practical and which absolutely will prevent burns.

For workmen handling ladles, or hot metals of any kind, also for welders and other operators, asbestos gloves, leg pads and aprons are available, and should be provided. It may cost a little to provide these things, but it never costs as much as paying for burns or other accidents which may happen. Many cuts and abrasions of the hands can be prevented by providing leather gloves of special designs. Frequently it is necessary to provide also sleevelets where special protection is required for a man's arms.

An example of what may happen when proper clothing is not provided is illustrated by a recent occurrence in a prominent midwest foundry where a workman pouring a mold was surrounded by a shower of sparks and a spatter of red hot metal. To protect his clothing the man had secured a burlap bag and tied about his body like an apron. No cord or string being handy, he fastened the bag around his body with a piece of wire. The bag had become greasy and oily and during one of the pouring operations a spark lodged in it and in a few seconds he was enveloped in flames. Fellow workmen tried to extinguish them but the bag was wired to the man's body and before it could be removed he was so badly burned that he died in great agony a few hours later. The man lost his life, his wife was made a widow, his seven minor children were left without his protection and it cost the company several thousand dollars, all because he had not been provided with a fireproof suit or an asbestos apron that at most would not have cost over five dollars.

Do not let a man work around your plant with ragged clothing, worn-out shoes, or covered with makeshift protection. The best protection you can get is none too good and its cost is many times less than accident costs. Whatever is paid out in money as compensation never squares the account because a human suffering and death never can be measured by a dollars and cents standard.

Recommend Fewer Sizes in Range Boilers

Manufacture of range boilers will be limited to 19 standard sizes if the recommendations of boiler manufacturers at a recent session with the division of simplified practice of the department of commerce are adopted. Frank Sutcliffe, of the John Wood Mfg. Co., Conshohocken, Pa., was appointed to provide a contract between manufacturers and the department. Distributors and users will be invited to a later conference.

Tests Welded Tanks

Investigation of the strength of about 50 tanks, some of which had been welded by gas and some by electricity, has been completed by the bureau of standards, Washington. This work, which was carried out in co-operation with the American Bureau of Welding, was begun on Dec. 4, and completed on Feb. 9, gives reliable information on the strength of welded tanks for the consideration of the pressure vessel committee of the boiler code committee of the American Society of Mechanical Engineers.

The results showed that double-V longitudinal welded seams are much stronger and more reliable than single-V welds. Recommendations were also made covering the design and construction of the heads. The pressures at which these tanks failed were so high that confidence in the safety of welded tanks which are properly constructed has been greatly increased. The method of testing, by hammering the weld while the tank is under a pressure of one and one-half times the working pressure, was discussed. Although this test did not prove as effective in showing up defective welds as had been hoped, its use nevertheless, is justified.

Another acceptance test proposed in this report is to increase the pressure until the shell of the tanks reaches the yield point. These tests show that the tanks are safe after being tested in this way. As it is probable that tanks having large outlets would be seriously deformed and, therefore, rendered unserviceable, this test is not likely to be adopted.

Cutting Iron with Oxyacetylene

Until Recently the Process Was Thought To Be Impossible, but Torch Has Been Developed Which Cuts Cast Iron Readily—Large Percentage of Impurities in the Metal Formerly Was a Detriment

BY A. S. KINSEY

MANY valuable applications of the oxyacetylene torch to the cutting of cast iron have developed since it was found about two years ago that this metal could be cut satisfactorily by the flame. There had been some difficulty in obtaining practical results at first, due principally to improper design of torches and tips. As was shown, however, an intermediate pressure cutting torch would cut cast iron satisfactorily, with modifications required only in the tip. In fact, a new tip just designed for such work will cut cast iron better than the writer has ever seen it done before.

Of course, it was hardly to be expected that there would be as great need of the oxyacetylene cutting torch for cast iron as there has been for low carbon steel, and any hesitancy to use the torch on cast iron would be but a repetition of the general attitude toward the oxyacetylene torch when it first was offered as a means for cutting steel. No one now questions the value of the cutting torch on steel, and it will not be long before the cutting of cast iron by the same principle of oxidation will be just as readily accepted. The justification for this belief lies chiefly in the fact that although until within the past few weeks the so-called cutting of cast iron was probably a melting action, as much as one of oxidation, it is now possible to do the cutting as completely by oxidation as is done in the cutting of steel. We will refer to this again.

As would be expected the railroad locomotive shops were quick to see the advantages of cutting cast iron with the torch, especially when this could be done with but the slight additional expense of the cost of only a special tip. About the first job attempted, therefore, was the scrapping of obsolete and worn out locomotive cylinders. At one time it was customary to break up these cylinders with the skull-cracker, a heavy cast iron ball hoisted 25 to 50 feet and allowed to fall upon the cylinders, but safety committees have prohibited this practice unless a high brick safety wall is built around the break pile to prevent flying pieces of the castings from injuring workmen. Most railroads have not had the available funds for this improvement, and as there was no other way to break up the cylinders they were stored in an out of way place.

The cutting torch is now being used to reduce these castings to charging-door size of scrap so that they may be melted in the cupola and added to the supply of good quality cast iron for the needs of the foundry. The cutting can be done in the scrap yard regardless of cold weather, and but little practice is required for a man to be able to do the work. It is true that the first cost of such cutting appears to be higher than that of the quick breaking of the casting with a skull-cracker, but on the other hand careful analysis of the cost for power, labor and repairs of the skull-cracker outfit will show that it is no more economical than the torch cutting.

One of the most serviceable pieces of cast iron cutting being done in the locomotive shop is that of removing bushings from the cylinder barrels and the valve chests. When a cylinder has worn too large in diameter the common practice is to reduce the inside diameter so that it again will fit the piston, by forcing into it a ring of cast iron, called a bushing, the full length of the cylinder bore. However, after a time this bushing becomes worn too large and it must be removed to make room for a new bushing. Until recently this has been done by chipping it out with hammer and chisel. The oxyacetylene tor h is now used for this work, and can remove a main cylinder bushing in about 15 minutes as compared with about 3 hours with a chisel. The details are as follows:

	With torch 15 minutes	With chisel 3 hours
Oxygen	$0.85	....
Acetylene	0.03	....
Labor	0.20	$2.40
Total	$1.08	$2.40

Two cuts the length of the bushing must be taken in both methods. The oxyacetylene cutting can be done without injuring the cylinder walls. In the case of cutting out valve chest bushings with the torch, three equidistant lengthwise cuts should be made to avoid marring the ports and bridging.

In a shipyard a heavy broken cast iron propeller is much in the way. The hubs are often too thick to break with a skull breaker; sometimes they are buried, or dumped into a swamp, but in city shipyards they often remain in the way. This condition need not continue, as they can be cut up with the oxyacetylene torch.

The following data were obtained from cutting propeller hub weighing 5 tons and requiring two cuts each 20 inches long through thicknesses varying from 7 to 12 inches.

Oxygen	$14.00
Acetylene	6.00
Labor, 2 hours	1.56
Total	21.56
Value of hub as scrap, about	100.00
Additional advantage	Out of way
Length of two cuts	40 inches
Thickness of cut	7 to 12 inches

Ordinary gates and risers of iron castings are usually broken off by a blow of a hammer, which is the most economical way. There are times, however, when big gates and risers have been improperly molded, or they may have a diamond-shaped end. It requires a big fire to cut cast iron by torch and the walls of cast iron pipe are so thin the heat from the oxyacetylene flame goes through the metals so quickly that the burning, or cutting, progresses rather slowly. A new design of torch tip has overcome this trouble, and the cutting of cast iron pipe with the torch will undoubtedly soon become common practice on water, gas, drainage and other uses of such pipe.

One of the most serviceable uses of the cutting torch is for beveling the edges of cast iron to be welded. The oxide scale left on the bevel by the torch may easily be shattered loose with a hammer, and the metal is not injured by the action of the cutting torch.

Recent figures show that the cost of cutting thick cast iron with the oxyacetylene torch is about four times that of cutting steel, the thicker

Paper presented at the December meeting of the Metropolitan section of the American Welding society, New York. The author is advisory service engineer, Air Reduction Sales Co., New York, and professor of shop practice, Stevens Institute of Technology, Hoboken, N. J.

metals being more economically cut than the thin ones.

In some of the latest cutting of cast iron a rate of about 10 square inches per minute was made in a cut 13 inches deep by 14 inches long. This would cost say 1 cent for labor, 12 cents for oxygen, and 3.5 cents for acetylene, making a total of 15.5 cents to cut 10 square inches per minute.

Steel 12 inches thick can be cut at a rate of about 30 square inches per minute, which would cost 1 cent for labor, 9 cents for oxygen and 1.5 cents for acetylene, a total of 11.5 cents to cut 30 square inches per minute.

To make these figures comparable with other cutting data we will compute them for cutting 100 square inches by hand torch.

CONSUMPTION

Material	Time min.	Oxygen c. f.	Acetylene c. f.
Steel	3.33	25	2
Cast iron	10	100	15

COST

	Labor	Oxygen	Acetylene	Total
Steel	$0.04	$0.30	$0.05	$0.39
Cast iron	0.10	1.20	0.35	1.65

Of course, this comparison should not end with these figures for if it were not possible to cut cast iron with an oxyacetylene torch it would have to be done by machinery. This would cost about $5.00 to cut off a section of 100 square inches. The torch will serve efficiently in these cases, and the cutting may be done close up to the casting without affecting the carbon balance of the iron and hardening the surface.

The cast iron tanks used in chemical plants sometimes requires a new bottom put in them. The old bottom can easily be cut out with oxyacetylene torch. The big cast iron bowl-shaped vessels used in nonferrous metal foundries, die and chemical plants and other places, wear out and must be removed and scrapped. Some of these vessels are 12 to 15 feet in diameter and are difficult to get out of the building. They can be cut in position with the torch, small enough to be sent to the cupola for remelting.

Sometimes it is desired to shorten the cast iron base of a big machine or such a base is located in a subbasement and must be scrapped, or the cast iron bed plate of an engine needs to be altered, or an opening must be made in some such casting down in a crowded engine or machine room. The oxyacetylene torch is proving invaluable for this sort of work, often avoiding serious delays in power and lighting plant operation.

Until recently the cutting of cast iron pipe with the oxyacetylene torch could not be done as cheaply as by diamond pointing, that is, cut by hammer and a chisel having machining cost about three times as much as the torch cutting.

To summarize, the comparative cost of cutting 100 square inches of metal is as follows:

Metal	Cut by	Cost per 100 sq. in.
Steel	Oxyacetylene torch	$0.39
Cast iron	Oxyacetylene torch	1.65
Cast iron	Machinery	5.00

Procedure in Cutting Iron

To cut cast iron it is necessary to observe the following rules:

1—Use a special tip in a regular torch for cutting steel if it is of the medium type.

2—Use the size of tip and the oxygen and acetylene pressures given in the following table.

Number of tip*	Thickness of metal	Oxygen pressure, lb.	Acetylene pressure, lb.
1	½"	20	4½
1	¾	30	4½
2	1	30	5
2	1½	35	5
2	2	45	5
3	3	55	7
3	5	75	7
4	7	95	9
4	9	125	9
5	10	130	10
5	15	150	10

*Type of tip made by the Air Reduction Sales Co., New York.

3—The flame should be about 2 inches long and be made carbonizing with an excess of acetylene.

4—Warm the casting near the cut for a few seconds with the oxyacetylene torch.

5—Start the cut at the bottom, directing the flame toward the cutter, and slanting the tip forward so that the flame strikes the bottom corner of the casting at an angle of about 45 degrees. Then after the cut gets well started gradually pull the torch toward the casting so that the cutting angle will change to a vertical position. As soon as the cut has penetrated the full thickness of the casting the tip should be slanted about 45 degrees, which will cause the sparks to be thrown away from the cutter. This will make the actual depth of cut about 18 inches, which can be accomplished quite satisfactorily.

6—If the cut is deep a helper should stand at the cylinders to keep up the oxygen and acetylene pressures.

7—The cut should be made by spiraling the tip, that is, instead of holding the torch steadily, as in the cutting of steel, give it a spiral motion so as to widen the cutting groove, called the *kerf*, allowing the flame free access to the metal, and get the slag out of the way quickly. Or the tip can be slightly swung from side to side to widen the kerf.

8—The cutting should be done at a speed which will leave no slag bridges across the kerf. The pieces should freely drop apart at the end of the cut.

9—As soon as the cut is made, cover the hot ends with asbestos, or dry sand, and do not knock off the slag scale until the metal is quite cold. These precautions will keep the cast iron soft and machineable. If the ends are not to be machined then they do not need to be covered, and the scale may be knocked loose while still hot.

10—The cutter should take extra precautions to protect himself against the unusual heat.

Much heat and smoke is produced in the cutting of cast iron as compared with the cutting of steel. The kerf must be made three or four times wider than that for steel, which requires the burning of a larger amount of the pure iron, called ferrite.

A liberal amount of slag scale is left on both cut surfaces of cast iron, which is a fortunate condition, as it prevents the iron from becoming too hard to machine.

The fact that the heated surfaces are but little harder after than before cutting is done, indicates that there has been but slight change in the carbon of the cast iron. Undoubtedly the oxide scale left by the cutting action serves as an insulator of the hot metal from the cold air, and allows it to cool slowly enough to cause the proper proportion of combined carbon to change back to graphitic carbon.

Ordinary iron castings contain graphitic and combined carbon. Graphitic carbon softens and weakens cast iron, while combined carbon hardens and strengthens it. When cast iron is melted practically all of the carbon combines with the iron and none is left in the graphitic condition. If the iron is then allowed to cool quickly all of the carbon will remain in the combined state and the metal will be too hard to machine. However, if the cast iron is made to cool very slowly from the molten condition back to the cold solid casting, enough graphitic carbon will separate out to again equal about the original portion of the two carbons, and the casting will be soft and machineable.

Therefore, when cast iron is cut with the oxyacetylene torch the surfaces adjacent to the kerf are melted, or heated high enough to throw all the carbon in the combined state, and if the casting were allowed to cool quickly the cut surfaces would be too hard to machine. This is prevented by the heavy oxide scale which is formed from the cutting of the metal and which completely covers the two surfaces, thus insulating the hot metal from the cold air and causing a slow cooling. In the cutting of some cast iron the scale may not be thick enough to produce sufficient final softness, in which case it

would be well to cover the cut ends with asbestos paper. Of course, the oxide scale should not be disturbed until the casting is cold to the hand, when the scale may easily be shattered loose by a hammer blow.

Previous to about two years ago, it was generally believed that cast iron could not be cut with the oxyacetylene torch. At that time some interesting experiments proved that cast iron could be cut, and it was concluded that the cutting was accomplished by a combination of oxidation and melting. While the deposit from the cutting was largely oxide ash, there was also a liberal amount of molten iron in it. It was therefore concluded that complete oxidation or burning of the metal, similar to that accomplished in the cutting of steel, was impossible, although the metal could be satisfactorily cut with the oxyacetylene torch.

Complete Oxidation Possible

It will be of interest, therefore, to learn that recent experiments in the cutting of heavy cast iron was accomplished with as perfect oxidation of the metal as is usual in the cutting of steel. That is, there is now good reason for believing that cast iron can be oxidized just as completely as steel if the proper design of torch and tip are used.

The cutting last referred to was about 13 inches deep by 14 inches long, although when the cut was properly started and the cutting angle of 45 degrees was gotten the depth of the cut was about 18 inches. The casting had been taken at random in a scrap yard, and its chemical composition was not known. The oxide deposit from the casting was free of molten iron and could easily be crushed between the fingers. The kerf surfaces showed the best cutting of cast iron the writer has seen. The cutting was done with our latest model cutting torch for steel, fitted with a new design of tip for cutting cast iron.

It is evident, therefore, that the only reason cast iron has not been cut by complete oxidation heretofore is because the tip was not properly designed to accomplish the work.

From the first cutting of cast iron it was found that the best flame was a carbonizing one using a liberal excess of acetylene, and the new tip is designed to take advantage of this.

In the light of the latest results of the cutting of cast iron it may be of interest to compare the oxidizing conditions of that metal with steel. In the cutting of steel a spot is made red hot (this temperature has been determined to be about 1800 degrees Fahr. for wrought iron and low carbon steel) with the preheating flame, and then the high pressure oxygen of the torch is snapped on. This starts cutting action and a groove is burned or oxidized through the metal.

Now it is well known that the less the amount of chemical impurities in the metal the easier it may be cut. So wrought iron containing only about 0.25 per cent impurities would cut more readily than steel containing about 0.85 per cent impurities, while cast iron with about 7.0 per cent impurities would be the hardest of all to cut. The principal impurities in all these metals are carbon, silicon, manganese, phosphorus and sulphur. It is quite probable that carbon is the particular chemical element which affects the cutting. Wrought iron contains only about 0.02 per cent, low carbon steel about 0.20 per cent and cast iron about 3.50 per cent carbon.

Cutting Action Slowed Down

It is generally thought that the graphitic carbon lying in flake form between the grains of cast iron tends to interfere with the burning of the iron and thus retards the cutting action of the oxyacetylene torch. There is also the possibility of the comparative amount of combined carbon in the pure iron making it difficult to burn the iron. Again it may be that the high proportion of 2.5 per cent of silicon in cast iron to only about 0.05 per cent in steel may have a deterrent effect on the cutting.

Whatever may have been the cause of the difficulty heretofore, one thing is now certain, cast iron can be completely oxidized by the oxyacetylene torch even in thicknesses up to 18 inches.

Estimating Future Pig Iron Production

BY C. D. RAWSTORNE

A PRODUCTION of around 50,000,000 tons of pig iron in the United States by 1930 is indicated by a graphic presentation of figures for the last six decades, and their projection through the present 10-year period on a basis of known averages. This would seem to be a very conservative estimate, and comparing the probable production of 50,000,000 tons with the output of 38,500,000 in 1918 when the average number of furnaces in blast for the year was 349, it points to the conclusion that extensive rebuilding and new furnaces will be necessary. Though the average number in blast in 1918 was 349, in August of that year the number was 371.

The accompanying table shows the population of the United States, taken from census reports, from 1860 to 1920; the percentage increases in population by decades; pig iron production, averages by decades; record yearly production in each decade; per capita consumption, and the percentage increase in per capita consumption.

The population as estimated for 1930 is figured from the average of increases, omitting the decades ending 1880, 1890 and 1910, and giving for 1930 a 20 per cent increase over the population as of 1920. In estimating the probable production of pig iron for 1930 the increases in output for the decades ending 1890, 1900 and 1910 were omitted as being abnormal. The average increase for the other periods is 23 per cent, and a per capita consumption of 720

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Pig Iron Averages Projected to 1930

Year	Population	Increase per cent	Pig iron production tons	Record year in decades	Per capita consumption, pounds	Percentage increase in pounds per capita
1860....	31,500,000	..	1,000,000	1,800,000	65	..
1870....	38,500,000	22	1,500,000	3,800,000	80	23
1880....	50,000,000	*30	2,500,000	9,000,000	100	25
1890....	62,500,000	*25	5,700,000	14,000,000	180	*80
1900....	76,000,000	20	10,000,000	26,000,000	260	*44
1910....	93,500,000	*23	22,500,000	39,000,000	480	*84
1920....	110,000,000	18	32,500,000	.....	585	22
1930....	†132,000,000	20	†47,500,000	.....	720	23

*Omitted in obtaining 1930 average.
†Estimated.

tons of pig iron is indicated for a population of 132,000,000 in 1930.

Unusual conditions may develop from time to time, as in the past, and affect the output and consumptoin of pig iron, but the estimates as arrived at for 1930 are based on normal averages. For the decade ending 1890 there was an increase of 80 per cent in per capita consumption, as against increases of only 23 and 25 per cent, respectively, for the two precreases in output for the decades ending 1900 there was an increase of 44 per cent, and for the decade ending 1910, an increase of 84 per cent. The elimination of these unusually large increases, and adherence to those of a more uniform character, from 22 to 25 per cent, it is believed keeps the estimate for 1923 well within what actually will be attained

1920 Estimate Too High

An article was published in IRON TRADE REVIEW, Jan. 10, 1907, by Dr. William Kent, then dean of the L. C. Smith college of applied science, Syracuse university, reviewing the record of pig iron production in the United States for 42 years and presenting a graph with a projection indicating a production in 1920 of 67,340,000 tons. In the April 16, 1914, issue of IRON TRADE REVIEW the graph was extended. The curve produced based on past records showed a production of 50,000,000 tons in 1920 and 100,000,000 tons in 1930. This curve is shown on the accompanying graph by the letter *A*.

Scrap Increase Affects Production

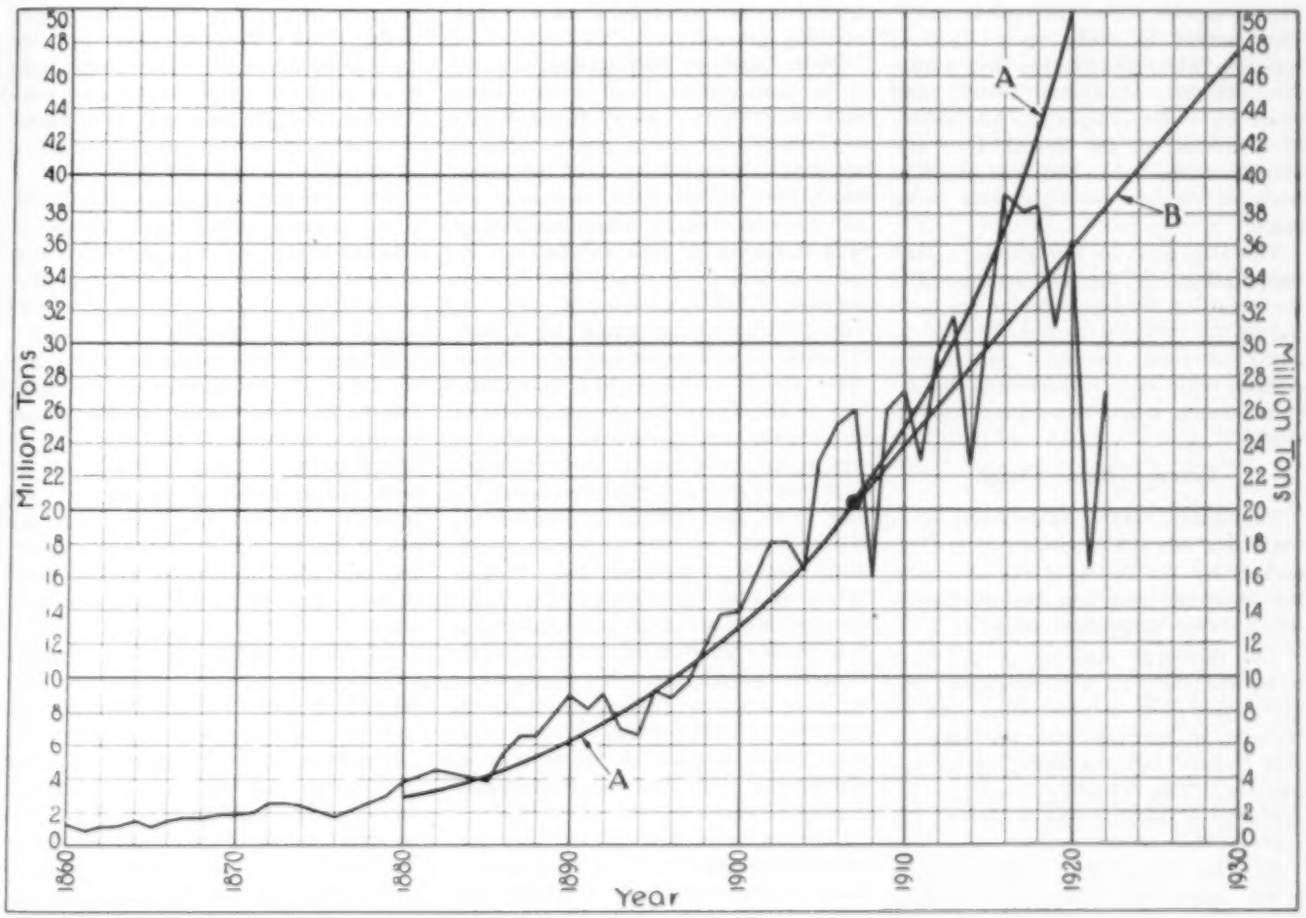
Dr. Kent in the article of Jan. 10, 1907, figured the percentage of gain of past years and said there was good reason for believing that the rate for 25 years from 1880 to 1905, which included one serious panic and two smaller ones, would continue for a long time. Using the rate for those years, 7.424 per cent per annum, or 104.742 per decade, Dr. Kent gave his estimate for production up to 1920 as 67,340,000 tons. The actual figures fell far short of his prediction, although attention was called to the increase in scrap "which would undoubtedly change the curve materially."

Referring again to the graph, if we draw a straight line *B* from the probable production of 47,500,000 tons in 1930, tangent to the curve, the point of tangency occurs about the year 1908. Plotting the probable production, as indicated, and the actual production we find only four years where actual production was less than the probable. This comparison in tabular form follows:

	Probable output tons	Actual output tons
1908	21,500,000	16,000,000
1909	22,700,000	25,400,000
1910	23,800,000	26,800,000
1911	25,000,000	23,200,000
1912	26,100,000	29,300,000
1913	27,300,000	31,700,000
1914	28,500,000	23,000,000
1915	29,600,000	29,600,000
1916	30,800,000	39,000,000
1917	32,000,000	38,200,000
1918	33,100,000	38,400,000
1919	34,300,000	30,600,000
1920	35,500,000	36,400,000

Study High Nickel Steel

Investigation has been made recently by the bureau of standards, Washington, of the relation of the structure of invar or 36 per cent nickel steel to the forgeability of the alloy. It was found that although the ingots were cast in chilled molds, the rate of cooling was not sufficiently rapid to prevent the formation of excessively large columnar crystals producing brittle ingot which broke readily on forging. As a result of these tests ingots will be cast in water-cooled molds to increase the rate of cooling and thus prevent, if possible, the formation of the large columnar structure, making the ingots more readily forgeable.



GRAPH SHOWS ACTUAL AND ESTIMATED PRODUCTION OF PIG IRON IN UNITED STATES. CURVE *A* WAS PROJECTED FROM AVERAGES UP TO 1913. AS NOW PROJECTED AT *B* A PRODUCTION OF 47,500,000 TONS IS INDICATED FOR 1930

Designs New Electric Furnace

Metal Melted in Crucible Shaped Vessel with Only One Opening—Electrode through Roof Sheathed To Prevent Ingress of Air—Other Electrodes Placed in Lateral Lining in the Hearth

BY R. SYLVANY

THE greatly increased application of electrometallurgy has directed fresh attention to the different types of electric furnaces which are capable of being successfully employed for melting and refining metals. Many types of furnaces have already been adopted in industrial practice and have been widely installed.

The furnace described in this paper, the idea of which is due to T. Levoz, a French metallurgist, presents certain interesting features, and illustrates one of the latest French developments in this field. The use made of it during the war for the production of high speed steel demonstrated the principles on which it is constructed and which we shall briefly describe.

The refining of a steel bath is effected by the action of the slag, of a fixed composition, on the molten metal. This action is made up of several reactions which require for their realization certain conditions already laid down by Prof. Campbell in the course of a meeting of the British Iron and Steel institute, when the first practical trials of electric furnaces were being made.

The slag must be brought to a high temperature, as this temperature and the resulting fluidity combine in facilitating the refining reactions. The rapidity of these reactions, indeed, increases with the temperature, the increase being much more than proportional.

Furnace Kept Closed

The great fluidity maintained in a basic slag and the formation of calcium carbide by the action of the arc upon the limestone slag are two conditions which favor desulphurization.

The thorough rabbling of the bath is indispensible, as it is necessary that every part of it in succession shall be brought in contact with the slag so that it may free the metal of its impurities. This rabbling must be secured by a suitable distribution of the current.

For this reason Prof. Campbell laid stress upon the following important points, the realization of which appeared to him essential:

The furnace should be closed as much as possible and should be of the simplest possible construction; the furnace should be entirely separated from the electrical fittings of the generators and transformers, which should be maintained at their highest capacity in order to increase the power of the installation; the wear of the refractory materials of the linings should be saved by applying the heat at the center of the bath, and those of the roof by protecting them from the direct radiation of the arc by the electrodes themselves; the slag should be given as large an area as possible so as to increase the refining surface; and the temperature of the slag should be maintained above that of the steel, so as to secure fluidity and facilitate the high basicity required by an intensive refining process.

Prof. Campbell also advised the use of a homogeneous and solid hearth, and with this in view, recommended that electrodes should not be allowed to pass through it. On the other hand, Dr. W. Borchers, who was one of the pioneers of electrometallurgy, was speaking of the satisfactory results obtained by this latter type of furnace. The principle of this, the Girod furnace, was based on a combination of the resistance arc furnace. The metal to be melted constituted one of the electrodes, the slag covering it forming an electrolytic conductor, the metal constituting the resistance, and the current being distributed by one or several carbon electrodes traversing the roof and by multiple contacts passing through the bottom. There was no question of the solidity of this furnace. The advantages arising from a uniform distribution of the current, effected by the arrangement of the contacts passing through the bottom, constituted one of its essential characteristics, namely that of insuring the efficacy of the furnace's refining action.

The section and length of these contacts were such that no one of them could carry more than a certain fraction of the total current without becoming overheated and, consequently, without its resistance being excessively increased. The regulation of the temperature and resistance of each contact was effected by cooling the hollow extremities by a water circulation system. Certain inconveniences were thus remedied, and as a result of the uniform arrangement of the contacts around the prolonged axis of the carbon electrodes the advantage of a uniform rabbling of the bath was obtained. Prof. Campbell's one objection thus disappeared; moreover, the results already obtained at that time demonstrated the furnace's merits.

Life of Lining Increased

When regularly working, the lining, which was chiefly composed of burned dolomite, withstood at least 80 heats. The bottom of the furnace stood 120 to 160 heats without repair and had then lost 4 inches in thickness. With charges of molten metal the lining could stand 200 operations, and the roof about 20 to 35. The wear of the other parts of the furnace was comparatively slight and the consumption of carbon electrodes was from 26 to 33 pounds per ton of steel.

The principle adopted in the Girod-type furnace, which was also to be adopted in the Keller-type furnace with a better distribution of current, thus marked an advance in the construction of electric furnaces.

In the Keller-type furnace the distribution of the current in the bath, instead of being merely carried round a certain number of contacts, was effected over the whole depth of the bath by means of a bundle of iron bars surrounded by refractory clay which formed the furnace bottom. The current was introduced by a large carbon electrode rectangular in section.

As in the Girod-type furnace, the intensity of current necessary was high, as it had to reach 3000 amperes; but this high intensity had fewer disadvantages as the current was better distributed and the electric resistance in the large single electrode and in the conducting hearth was not as great. The difficulty of water cooling and of overheating of the carbon electrodes was avoided.

The principles laid down by Prof. Campbell therefore were observed in

Paper prepared for the recent convention of the American Foundrymen's association held in Rochester, N. Y.

this furnace, notwithstanding the fact that the conductors passed through the hearth.

On the other hand, it might be objected that they were not followed in the first furnaces of the Heroult type, in which the better basic action was counteracted by the imperfect closing of the furnace, which was opened by three lateral doors and had the two electrodes passing through it from the roof. Nevertheless the effectiveness of the furnace was not as great as it might have been, although the rectangular surface of the bath was extended, because of the action of the arc being concentrated only in the vicinity of the electrodes. The intensity of the current alone was greatly reduced. The rectangular section, therefore, was unsuitable and at Remscheid it was reduced only to the zone of action of the arcs. The circular form introduced by Nathusius seems to be preferred, and it was this form of section which Heroult adopted for the 15-ton furnace which he built in the United States.

All these considerations led the inventor previously mentioned to produce a special type of electrical furnace, in which the principles already indicated were further developed and the various defects were minimized.

He sought on the one hand, to secure rapidity of fusion and on the other to insure good purification by making the current pass as directly as possible—but at the same time with uniformity of distribution—through the metallic mass and the slag, the furnace being simple in construction, strong and well closed, without an excessive intensity of current being necessary.

New Type of Furnace

For this purpose he constructed a crucible with only one opening for charging the material and the additions and for pouring the finished metal. He also placed the large carbon electrode in a sheath to obviate air currents in the space left free between the electrode and the roof. Thus he facilitated a better basic action.

Moreover, certain trials made for the first time at the electric power station of the commune of Jambes in Belgium enabled him to discover the possibility of placing electrodes in the lateral linings of the crucible without their being affected by wear at that level.

In fact, as the lateral linings of the furnace presented a larger surface than that of the hearth (bottom) the number of iron conductor bars embedded in the linings can be increased so that their section can be lessened.

Thus a strong magnesite bottom can be composed which resists the action of overheated metal much better than an armored hearth.

Wires of 0.25 to 0.4 inches were found sufficient to obtain currents of 1200 to 1500 amperes at 85 volts capable of developing the temperatures necessary for the purification of the entire mass notwithstanding the depth of the bath.

Conditions of the Metal

The electric resistance of the conductor electrodes thus constituted is almost negligible, for, as has already been pointed out, the surface of the linings permits bringing into play a considerable number of wires equivalent to such a large conductance section that, without taking account of the conductivity of the bottom the loss is already practically nil.

The use of metal conductors of small section tends to produce a more uniform circulation of the electric current than the use of conductors of large section and the large surface of the positive carbon electrode is well utilized owing to the excessive splitting up of the current at the surface of the bath.

The slag is highly and uniformly heated throughout its surface, and its temperature may be raised to the point required to secure good fluidity and intense chemical action.

To facilitate the process of refining still further the inventor was led to adopt a special device which consists in introducing two rows of superimposed lateral electrodes, the lower ones being termed fusion electrodes and the upper ones refining electrodes.

The fusion electrodes, which vary in number with the capacity of the furnace, are formed by a bundle of pure iron wires imbedded at the base in a mixture of magnesia and tar and united at the top so as to give a good contact with the metal contained in the crosswise channels arranged in the furnace hearth.

These electrodes are joined in series by a copper bar, which is itself connected by cables to the negative pole of the current transformer. The refining electrodes, which are placed on a level above that of the others, facing the slag, are also variable in number according to the capacity of the furnace.

A special device enables the current to be taken from the fusion electrodes and afterward from the refining electrodes, or alternatively from both rows of electrodes at once.

The number of wires forming the electrodes, as also the section of these wires, varies with the capacity of the furnace. The wires of the fusion electrodes have always a larger section than those of the refining electrodes.

In every case the current enters by a large vertical carbon electrode passing through the furnace roof, its horizontal section being half that of the furnace crucible.

When direct current is employed this large positive electrode is hollowed out and forms a heat reflector; moreover the oxygen of the bath is liberated and is carried to the positive pole instead of remaining in the bath and oxidizing it.

The furnace proper consists of a steel plate body with a nonconducting refractory lining and fitted with a cover. Hollow trunnions, through which the conductor cables pass, enable the whole apparatus to be tilted.

In this furnace the current always passes through a layer of relatively thin metal, which enables currents of much low intensity to be used. An intensity of 1500 amperes is not exceeded; nevertheless the temperatures obtained are diffused throughout the entire mass of the slag and metal.

As was mentioned at the beginning of this paper, this furnace was employed during the war in the production of high speed steel It was installed at the Jarville works of the Eclairage Electrique Co., near Nancy, now amalgamated with the Thomson-Houston Co. The results obtained appear to indicate that, with continuous working and by treating 2200 pounds per heat with an amperage of 3000 at 80 volts it would be possible with one furnace to obtain an output of 8 tons per day by deoxidizing the metal obtained from a converter.

Develop New Methods for Analyzing Aluminum

In connection with investigations in aluminum metallurgy, the bureau of mines has been required to develop methods of analysis for aluminum and aluminum alloys, and research work has been carried out to develop methods for the determination of aluminum oxide and aluminum in commercial aluminum and its light alloys. The purpose of the investigation was to prepare a compendium of methods that could be employed in practice.

Methods have been developed for the direct determination of aluminum in commercial aluminum pig and in aluminum alloys and for aluminum oxide in these materials, and the results are being written. The ordinary methods of analysis for copper, silicon, iron, zinc, tin, nickel, titanium, carbon and other impurities and additive elements contained either in aluminum or its light alloys are in process of being checked, and a bulletin covering the subject is in process of being written.

Turns to Making Pocket Knives

Firearms Manufacturer Utilizes Expanded Capacity at End of War for the Production of One Line of Cutlery — Output Is Expedited by Use of Special Machinery and Standardization of Parts

BY B. K. PRICE

INTERESTING developments have taken place in the works of some of the more recently established cutlery organizations, especially in cases where the companies concerned have entered the cutlery industry after wide experience in other and somewhat allied lines of manufacture.

In this category is the cutlery branch of the Remington Arms Co., Bridgeport, Conn. Up to date the Remington company has restricted its production solely to pocket knives and its many years experience in other branches of the hardware field has led to the institution of high standards of practice and the adoption of interesting methods of production.

Utilize War-time Equipment

Behind the decision of the Remington company to take up the manufacture of a new product lies the story of a manufacturer of arms and ammunition left at the end of the war with a greatly expanded capacity, and obliged to turn to a staple, peace-time product to which it could apply in the fullest measure its experience, surplus plant facilities, existing sales organization and channels of distribution. The pocket knife met these requirements.

Within five months after the signing of the armistice, the organization of this new branch of Remington production was under way. Certain necessary plant alterations were undertaken, knife models were designed and a call issued throughout the organization for cutlers, with the result that a large number were recruited, including one who now is the master cutler. As it subsequently developed, a number of these men had worked in the cutlery industry for many years but in the mustering of forces for essential war work had become estranged from their regular work.

To produce a satisfactory product at a marketable price it was deemed essential to standardize the work as far as possible. This was considered especially necessary in the case of pocket knives, due to the large variety of bladings, handle materials and finishes demanded. As a result of standardization, advantage may be taken of the principle of interchangeability, thus making possible a wide line of blade combinations. Incidentally, the handle die is used as the basis of each model, as it determines the class and purpose of the knife. Standardization also called for the installation of automatic machinery wherever possible throughout the plant. In cases where the required automatic machinery did not exist, the company designed and built the equipment in its own works, a large tool room being maintained for such purposes. The first shipment, something more than 500 dozen knives, was made in June, 1920, nine months from the day preparations to manufacture cutlery were commenced. Since that time, the company has developed into one of the largest manufacturers of pocket knives in the world.

Wheel Stock Is Extensive

The first intimation of the extent of the grinding operations carried on in the Remington plant is to be found in the store room. Here approximately 80 different sizes and kinds of abrasive wheels are kept in stock. Many of these are used for experimental purposes apart from the regular course of production. But nevertheless the number employed in productive operations is impressive. In addition to the wheels,

FIG. 1—THE SIDES OF THE KNIFE BLADES ARE FINISHED ON SPECIAL GRINDING MACHINES—ONE OPERATOR LOOKS AFTER SEVERAL MACHINES

there are large boxes containing various grades of emery, ranging from No. 00000 to No. 70. This emery is used on various operations throughout the process of manufacturing a knife.

These boxes are placed on the shelves as far apart as possible to preclude the mixing of one grade of emery with another. Even a small amount of foreign material often renders the entire contents of a box unfit for use. This same precaution is taken in connection with the storage of certain kinds of strip steel; for instance, the blade steel is widely separated from the spring steel. In the form in which it comes from the mill there is a possibility of one kind of steel being taken for the other, the mistake not being discovered until the process of manufacture has commenced. A feature of the Remington company's plant is a completely equipped laboratory. All the buffing compounds, emery cake, oil and grease, as well as steel, brass, nickel, silver and other metals are subjected to analysis and test before going into production.

FIG. 3—KNIFE HANDLES ARE POLISHED ON SETUP WHEELS AFTER ASSEMBLY

Knife Blades Are Forged

After the blade steel is cut into small strips convenient for handling, it is blanked into shapes which are sent to the forging department, where 12 power hammers are installed. The blades are then nail marked and trimmed, and in this latter process is to be found the first application of abrasives. Four grinders of the company's manufacture are used. Each one is operated at 1700 revolutions per minute. The wheels are alundum, 14 inches in diameter, 1-inch thick 80 grit, R grade.

The next step is piercing the blades, preparatory to inserting the rivets. As the blades are interchangeable, absolute precision is necessary and for this work the company has developed machines of its own. The blades are then sent to the heat treating department where they are hardened and tempered. The company's experience in the treating of rifle parts, and during the war in hardening and tempering bayonets, has enabled it to produce what is believed to be nearly absolute uniformity. The pocket knife blades are given the same treatment that the company uses in treating rifle parts. The heat treating system is governed by pyrometers which are checked by laboratory engineers on an average of four times a day. All rooms where heat treatment is carried on are shaded so that operators can become accustomed to the colors required for the proper treatment of steel. The color tests are not the governing factor as the pyrometers take care of the accuracy of the treatment, but they serve to assist the operator in handling his work.

FIG. 2—SPRINGS ARE POLISHED BEFORE THE KNIFE IS ASSEMBLED

Blades Are Straightened

As the blades become lightly warped in the process of hardening straightening is necessary. Formerly this work was done by hand but automatic hammers have recently been developed with which it is said one man can do the work of five. The blades are next tested for flaws by going through a ringing process. The defective blades are detected by this operation and thrown out before other work is performed on them. Work on other component parts of the knife is carried on simultaneously. The bolsters are blanked out at a rate of 20,000 a day. This operation is called swaging and is done on large power presses. The bolsters are then trimmed, after which they are ready for assembling. The scales or liners are also blanked and trimmed in this department.

The blades, after being tested for flaws, are sent to the automatic grinders shown in Fig. 1. At present there are about 72 of these machines in operation all of which are of the Hemming pocket knife type. The machines are operated in batteries of two. One machine grinds one side of the blade, while the second

FIG. 4—FINAL FINISHING ON THE BLADES ALSO IS PERFORMED AFTER ASSEMBLING

grinds the other. Upon completion of the process in each instance the machine automatically stops. One operator is usually in charge of two batteries. The machines are equipped with alundum wheels in 6660 grit, P grade, and are operated at a speed of 575 revolutions per minute. The blades are next sent to the glazing department, where rows of double-head grinding machines are installed, approximately 100 in all. These machines were built by the Remington company, and are equipped with alundum wheels, 18 inches in diameter, 1-inch wide, 80 grit. They are operated at 1700 revolutions per minute.

Making the Springs

Springs are blanked out in much the same manner as the blade, after which they are pierced and trimmed to length. Later upon being heat treated they are ground and polished. The polishing is performed at this stage because the surface cannot be reached after the knife has been assembled. This is done through a series of operations, first with an abrasive grease and then with a lime mixture. This department is shown in Fig. 2 of the accompanying illustrations.

In the assembly of the knife, the bolster scales, which are the linings of the handles, and the bolsters, which are the metal tips on the outside and at the end of the knife handle, are riveted together and then the handles which are of various materials such as pearl, stag, wood, etc., are fastened to the lining scales and bolsters by special automatic machines designed and built by the Remington company. The handles and springs are assembled and then forwarded to the cutlers where the blades are inserted and then fitted.

After assembly the knife goes to the hafting department, illustrated in Fig. 3, where the handle is put through several finishing operations. More than 150 machines are installed in this department, and extreme care is taken in the abrasives used to get the desired finish. Stag handle knives are treated differently than pearl, while both are handled differently than composition handles. Each type of handle is treated differently there being some 10 different kinds to be finished.

From the hafting department, the knives go to the blade finishing room where the blades are glazed or crocus finished in accordance with specifications. There are 70 machines in this department and considerable study was required to fit the proper wheels. The machines are arranged in sets each of which is in charge of one operator, who performs a certain function and passes the work to another operator. A view of this department is shown in Fig. 4. In all rooms where grinding, glazing or polishing is performed an exhaust system is installed to convey the emery and other dust to a settling tank on the roof.

Sharpening Is Done Last

The final process in the manufacture of the knife is the etching and sharpening. The latter comes first, revolving hones shown at the right of Fig. 5 being employed. For this work women are largely employed, due it is said, to their greater delicacy of touch. After sharpening, the knives are inspected carefully for any imperfections. They are then passed over to expert hand honers by whom each knife is honed on a flat stone. In this operation experienced men are employed who understand thoroughly the angle at which the knife should be held to receive the proper edge. After this operation the knives are again inspected and passed over to another department for final cleaning. Finally they go into the wareroom where they are wrapped, packed and sealed.

FIG. 5—HOW KNIFE BLADES ARE HONED AND INSPECTED

Late News of the Societies

Notes on Past and Coming Meetings of National and Local Trade and Technical Organizations

TENTATIVE plans for the entertainment of visitors at the Cleveland convention of the American Foundrymen's association and related organizations, April 28 to May 3 are nearing completion. At that time the Metals Division of the American Institute of Mining and Metallurgical Engineers, the American Malleable Casting association and the Foundry Equipment Manufacturers association will hold their several meetings.

A ladies reception committee has been formed to assist in receiving the visiting ladies. A hostess will be stationed in each hotel by this committee, and others will be in attendance at the ladies headquarters in the Cleveland public hall. On Tuesday May 1 at 11 a.m. automobiles will be provided to take the ladies for a drive through the east side park system to the Wade Park manor, where they will be tendered a luncheon by the Cleveland organization. This will be followed by an inspection of the Museum of Art, one of the finest art galleries in the country. A special concert will be arranged in the conservatory of the Museum, following which the automobile sight-seeing trip will be resumed.

Tuesday night will be devoted to a theater party, the entire Keith Palace theater has been chartered for the occasion. An exceptional vaudeville bill will be arranged for the foundrymen's night.

A second automobile trip over the city is planned for Wednesday, the western part of the city and Lakewood being included in the route suggested. A card party and tea will be served at one of the beautiful clubs along the shores of the lake. Wednesday night, May 2, is set aside for the annual subscription banquet of the American Foundrymen's association. This will be followed by a reception and dance, offered by the local foundrymen and manufacturers.

* * *

Foundrymen Meet

Frank W. Brooke in discussing "Electricity in the Foundry" before approximately 100 members and guests of the Pittsburgh Foundrymen's association Monday evening, March 19, fully described electric furnace practice as applied to foundry needs. The occasion was the March meeting and dinner of the organization held at the General Forbes hotel, Pittsburgh. Mr. Brooke, who is chief engineer of Wm. Swindell & Bros., Pittsburgh, has talked before local foundrymen's organizations at Philadelphia, Chicago, Cincinnati and Detroit on the same subject. Plans are being formulated for the attendance of a large number of Pittsburgh foundrymen at the annual convention of the American Foundrymen's association and exhibition at Cleveland April 30 to May 3.

* * *

Discuss Railroad Capacity

"A General Plan for Increasing the Capacity of the Railroad Systems in the Pittsburgh District" was the subject of an address delivered by George S. Davison, president, Gulf Refining Co., Pittsburgh, and Norman W. Storer, general engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, before the monthly meeting of the Engineers' Society of Western Pennsylvania, which was held Tuesday evening, March 20, in the William Penn hotel, Pittsburgh. The paper was illustrated by lantern slides and general discussion followed.

* * *

Discuss Malleable Cast Iron

A joint meeting of the Quad City Foundrymen's association and the American Society for Steel Treating was held at the Davenport chamber of commerce Thursday night, March 15. Dr. Enrique Touceda, consulting engineer of the American Malleable Castings association, Albany, N. Y., delivered an address on "Malleable Castings." Dr. Touceda traced the historical development of iron making with special reference to malleable cast iron. The nominating committee of the foundrymen's association recommended the following officers be elected at the annual meeting to be held April 16 in the Moline chamber of commerce. A. G. Hageboeck of the Frank Foundries Corp., Moline, Ill., is named for president, John H. Ploehn of French & Hecht, Davenport, for vice president, and H. C Cooper of the John Deere Harvester Works, East Moline, for secretary-treasurer.

Convention Calendar

April 3-7—American Chemical society. Spring meeting New Haven, Conn. L. Parsons, P. O. Box 1515, Washington, is secretary.

April 18-19—National Metal Trades association. Annual convention, Hotel Astor, New York. Louis W. Fischer, Peoples Gas building, Chicago, is secretary.

April 18-19 National Metal Trades association. Annual convention, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle street, Chicago, is secretary.

April 18-20—Society of Industrial Engineers. Spring convention in Cincinnati. The headquarters of the society are at 327 S. La Salle street, Chicago.

April 19-21—American Gear Manufacturers' association, annual meeting, Hotel Cleveland, Cleveland. T. W. Owen, 2443 Prospect avenue, Cleveland, is secretary.

April 24-27—American Hardware Manufacturers association. Spring convention, Windsor hotel, Jacksonville, Fla. F. D. Mitchell, 1819 Broadway, New York, is secretary.

April 25-27—National Foreign Trade Council. Annual convention in New Orleans. O. K. Davis, 1 Hanover square, New York, is secretary.

April 28-May 3—American Foundrymen's association. Annual convention and exhibition at Public Hall, Cleveland. C. E. Hoyt, 140 South Dearborn street, Chicago, is secretary.

May 3-5—American Electrochemical society, semiannual meeting, Hotel Commodore, New York. Colin G. Fink, 327 South La Salle street, Chicago, is secretary.

May 7-9—American Association of Engineers. Annual convention at Norfolk, Va. C. E. Drayer, 63 E. Adams street, Chicago, is secretary.

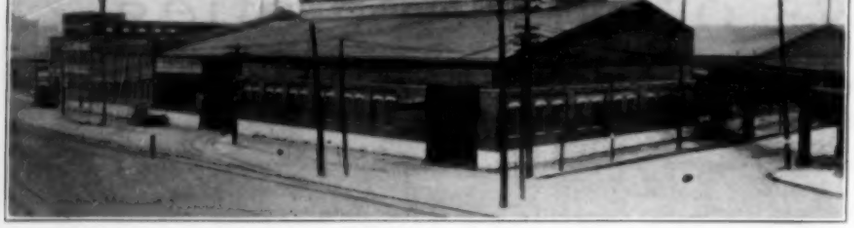
May 15-16—National Pipe & Supply Association. Convention at Cincinnati. Geo. L. McIlvane, 909 Oliver building, Pittsburgh, is secretary.

May 17-19—National Supply and Machinery Dealers association; Southern Supply and Machinery Dealers association; and American Supply and Machinery Dealers association, triple convention, Cincinnati. F. D. Mitchell, 1819 Broadway, New York, is secretary.

May 28-31—American Society of Mechanical Engineers. Spring meeting at Montreal. Calvin W. Rice, 29 W. Thirty-ninth street, New York, is secretary.

June 14-15—American Society for Steel Treating. Spring sectional meeting, Hotel Bethlehem, Bethlehem, Pa. W. H. Eisenman, 4600 Prospect avenue, Cleveland, is secretary.

June 25-26—American Society for Testing Materials, annual meeting at the Chalfonte-Haddon hall hotel, Atlantic City, N. J. C. L. Warwick, 1315 Spruce street, Philadelphia, is secretary.



General view of Cincinnati Iron & Steel Co. plant recently acquired by Joseph T. Ryerson & Son, Inc.

Ryerson Now Owns Six Plants

AS THE result of its recent purchase of the Cincinnati Iron & Steel Co., Cincinnati, the Joseph T. Ryerson & Son, Inc., has increased its operations to embrace six steel service plants. Those in operation besides the Cincinnati plant, are located in Chicago, St. Louis, Detroit, Buffalo, and New York.

Lewis E. Skinner, who is in charge of the new plant, has been connected with the company for 18 years. Assisting Mr. Skinner is C. A. Parnell, former assistant to Arthur Allshul, at the company's Buffalo plant.

This latest acquisition occupies a full city block with about 110,000 square feet of floor space. At the present time a large stock of steel is on hand at the plant, including bars, shapes, plates, sheets, tubes, rivets, bolts, nuts, pipe, etc. Equipment will be installed to make possible a 24-hour shipping schedule. The plant is well located for truck deliveries and is near the bridges for Kentucky shipment. Two loading tracks of the Baltimore & Ohio railroad traverse the plant, facilitating speed for out-of-town shipments.

Way Is Now Open for Merger Hearing

Washington, March 27.—Bethlehem Steel Corp. and Midvale Steel & Ordnance Co. having filed their answers to the federal trade commission's complaint charging the Bethlehem-Midvale-Lackawanna merger with being an unfair method of competition, the way is now opened to the announcement of the date for beginning the hearing. The commission is expected to act promptly and to call the hearing at an early date.

The answers of both Bethlehem and Midvale were perfunctory, disputing the commission's jurisdiction in the matter and contending that the commission's allegations are insufficient. Cadwalader, Wickersham & Taft, counsel for Lackawanna, called attention in a letter to the fact that Lackawanna had ceased its corporate existence on Oct. 13, 1922, and hence no reply was necessary. Cravath, Henderson, Leffingwell & de Gersdorff filed the answer for Bethlehem and Chadbourne, Babbitt & Wallace for Midvale.

The trade commission attacked the Bethlehem-Lackawanna merger on June 5, 1922, but on last Jan. 26 withdrew this complaint and joined the issues involved in the Bethlehem-Midvale-Lackawanna merger in one action. Should the commission, after due hearing, find the charge of unfair competition sustained, it would issue a cease and desist order, which in this case would be tantamount to directing the unscrambling of the three-company merger. The steel interests could then appeal to the federal courts.

Chicago Building Trades Peace Pact Signed

Chicago, March 27.—Peace in the building trades in Chicago seems assured for a three-year period as the result of an agreement just entered into between the Chicago Building Trades council and the Building Construction Employers' association. This provides that wages and working conditions be left to the arbitration boards of the various trades and the employers for settlement.

The bricklayers have signed up for a scale of $1.25 per hour, which is about a 10 per cent advance over the $1.12½ scale of the Landis agreement. Other trades are expected to follow this lead. The new scale is the same as prevailed before the Landis adjustment.

Efforts now are being made to bring the rebellious unions into the agreement to enable the closed shop to be restored in Chicago. Under the Landis award such crafts as did not accept its findings were regarded as open shop and nonunion workers were employed in them, without other unions objecting.

Canada Plans To Obtain Own Coal Supplies

Toronto, Ont., March 26.—The dominion house of commons has adopted a resolution declaring the time has come for Canada to have a national policy in relation to its coal supplies, so that no part of the dominion would be dependent on the United States. The whole question, including the matter of costs, transportation and inter-provincial action is referred to the committee on mines and minerals.

Testifying before the senate fuel committee, Sir Henry Thornton, president of the Canadian National railways, stated that the proposal to bring Alberta coal to Ontario and Quebec in competition with American coal looks fairly favorable, but "first it must be seen if freight rates can be established so as not to impair the revenue of the railways." The most advantageous time to ship coal would be between April and August.

The Canadian Locomotive Co. of Kingston, Ont., has received an additional order from the Canadian National railways for seven heavy transfer engines, which will be the largest switch engines in use in Canada and will be used for switching entire trains without breaking them into sections. The company is now working on orders from the National railways for 26 large engines and this additional order will keep the plant busy for several months. The present force of 375 men will be largely increased in a few weeks.

At the annual meeting of the British Empire Steel Corp. at Montreal, March 21, a resolution to reduce the authorized capital from $500,000,000 to $250,000,000 was unanimously adopted. This involves reductions in the 8 per cent cumulative first preference stock from $100,000,000 to $60,000,000; in the 7 per cent cumulative second preference stock from $135,000,000 to $75,000,000; the common stock from $210,000,000 to $75,000,000, and the elimination of the 7 per cent noncumulative and preference stock amounting to $15,000,000. George Campbell, of Halifax, N. S., president of the Bank of Nova Scotia, and J. F. B. Casgrain, Montreal, were added to the board of directors.

In its annual report for the year ended Dec. 31, 1922, the J. G. Brill Co., Philadelphia, shows net profit, after depreciation and federal taxes, of $954,969, equivalent to $13.18 a share on the common stock. This compares with $163,400, or $3.56 a share on the preferred stock in 1921.

Bethlehem Net Income Is Below 1921

Net income of the Bethlehem Steel Corp., for the year ended Dec, 31, 1922 totaled $4,605,330. This compared with $10,382,804 in the preceding year. The company failed to earn its dividend requirements by $2,332,000. At the beginning of the year Bethlehem plants were operating at about 30 per cent of capacity. This was greatly increased beginning in the middle of the year, and present indications, according to Chairman C. M. Schwab and President E. G. Grace, are that plants will operate at the limit of capacity permitted by labor and transportation conditions. The comparative income account for 1922* and 1921 follows:

	1922	1921
Gross sales	$131,866,111	$147,794,853
Mfg. cost, oper. exp., taxes, etc.	114,957,170	125,948,820
Net profit	16,908,941	21,850,588
Other income	2,884,772	3,904,144
Total income	19,798,713	25,754,677
Interest, discount, etc.	8,689,194	9,419,158
Depreciation, etc.	6,499,189	6,002,715
Net income	4,605,330	10,382,804
Dividends—		
8 per cent pfd.	2,400,000	2,400,000
7 per cent pfd.	1,262,310	1,043,560
Common	3,275,706	2,998,100
Deficit	2,882,685	*3,895,144
Previous surplus	12,418,928	10,826,785
Total surplus	10,086,244	14,722,929
Appropriations	†35,569	
Discount		‡2,804,000
Profit and loss surplus	10,050,675	12,413,920

*Surplus.
†Appropriations for and invested in addition to property and working capital.
‡Balance of discount on and expense of bond and note issues applicable to subsequent years.

The consolidated balance sheet as of Dec. 31, 1922, shows surplus of $10,050,674 compared with $12,418,929 at the close of the previous year. Inventories were increased from $39,240,537 in 1921 to $50,938,396 in 1922.

Notes and accounts receivable increased from $16,095,624 to $50,938,396, while notes and accounts payable increased from $20,507,506 to $25,279,969. Funded debt was increased from $146,163,892 to $156,611,612. Securities were reduced from $41,793,359 to $20,151,734 while cash at the close of 1922 was $8,085,621 compared with $13,087,869 the year before.

Steel in Transit

The steamboat ALIQUIPPA, of the Jones & Laughlin Steel Corp. is now transporting its ninth tow for distribution into the South and Southwest from lower river points. The present load is about 7000 tons. It is stated that the tenth tow is scheduled to leave Pittsburgh April 15, by which time the ALIQUIPPA will be back with a part of her empty barges. Other tows will follow at 30-day intervals as long as there is sufficient water in the lower Ohio to provide navigation. After dry weather sets in the company plans to operate between Pittsburgh and Louisville, that portion of the river being almost completely canalized and thereby permitting year-round navigation.

Navy Disposes of Surplus

Washington, March 27.—As the result of sealed bids opened on March 20 for the sale of approximately 6,600,000 pounds of steel tubing and tubes the navy department has made the following awards:

Tri-State Pipe Co., Bellaire, O., 2,942,430 pounds of steel boiler tubes at 2.375c per pound and 385,077 pounds of seamless galvanized steel tubing at 2.64c.

William Rosenblatt, New York, 1,289,370 pounds of steel tubing at 1.61c, 650,914 pounds of seamless hot-rolled steel tubing at 1.61c, and 28,279 pounds of annealed seamless steel tubing at 1.61c.

M. Samuels & Son, Brooklyn, N. Y., 367,366 pounds of seamless steel tubing at $33.60 per gross ton, and 35,864 pounds of galvanized steel tubing at $27.50 per gross ton.

Central Steel Reports

Net earnings of the Central Steel Co., Massillon, O., for 1922 totaled $2,343,987, after interest and charges, according to the annual report to stockholders. The company has outstanding $5,000,000 first mortgage bonds, due Nov. 1, 1941, $6,198,500 of 8 per cent preferred stock and 163,817 shares no par common stock. Dividends on common of 75 cents a share were paid starting July 10, 1922, and these were increased to $1 per share on Jan. 10, this year. The balance sheet shows current assets of $7,617,182, against current liabilities of $1,322,366 and total resources of $27,924,610 against $25,905,348 the year previous.

Locomotive Exports Large

Washington, March 27.—Poland and Danzig were the largest buyers of American locomotives in January, according to a report of the bureau of foreign and domestic commerce for the month of January, taking 14 steam locomotives. Other countries importing steam locomotives from America in January were, Quebec and Ontario 5, British Columbia and Yukon 2, Mexico 2, and Cuba 1. The total valuation for the 24 steam locomotives exported was $415,867. Fifteen electric locomotives were imported by the following countries: Quebec and Ontario 2, Chile 8, Chosen 2, Japan 1, and British South Africa 2.

Announces Specifications for Structural Steel

With a view toward bringing about uniform building codes throughout the country, as far as they relate to the design, erection and fabrication of structural steel, the American Institute of Steel Construction, Cleveland, has just announced a set of specifications which has been approved by that organization. The complete set of specifications will be published in the April 5 issue of IRON TRADE REVIEW. Several outstanding features are included in the code which is claimed to be the most satisfactory ever prepared on the subject. The specifications were prepared with a view of having all of the restrictions regarding the conditions of design entering into the design itself. This was accomplished by assembling under one heading all the conditions referring to allowable stresses in the structure.

The new specifications were prepared by the technical committee of the institute. The personnel of this committee was as follows: George F. Swain, professor of engineering, Harvard university, Cambridge, Mass., and past president American Society of Civil Engineers; M. S. Ketchum, dean of engineering, University of Illinois, Urbana, Ill.; E. R. Graham, president, Graham, Anderson, Probst & White, architects, Chicago; W. J. Watson, Watson Engineering Co., Cleveland; and W. J. Thomas, chief engineer, George B. Post & Sons, New York.

Made Sales Agent

The Thomas D. Prosser Co., Park building, Pittsburgh, has been appointed sales agent for the Cambridge Steel Products Co., Cambridge, O. The latter's plant located on the Baltimore & Ohio railroad, will commence to operate April 2. Prompt deliveries are offered of all round, square, and flat bars, including reinforcing concrete bars; angles and channels including 60-degree angles; small shapes for agricultural implements, metal beds and tools such as picks, mattocks, grub hoes, crowbars, wedges, sledges, etc. T. D. Prosser is president and Ira M. Smith is secretary of the selling company.

The United States district court at Cleveland has approved settlement of the $114,000 claim of the N. S. Axle Co., Pottstown, Pa., against the Templar Motor Corp., Lakewood, O, now in the hands of a receiver, for $20,000. The Templar company presented a counter claim of $129,000 which was considered in the settlement. The axle company's claim brought about the receivership.

Designs Large Type of Heavy Engine Lathe

Increase in the size of various types of machines, particularly steam turbines, turbo generators and similar machinery has called for a corresponding increase in the size of machine tools used in their manufacture. The machine shown in the accompanying illustration was built by the Niles-Bement-Pond Co., New York, to meet this need for larger tools. Although rated as having a 14-foot swing, the lathe actually will swing 14 feet 6 inches over the bed, 11 feet 6 inches over the carriage with removable section in place and 12 feet 9 inches with this section removed. The bed is 50 feet long allowing 34 feet between centers. The driving gears, mounted on the headstock give four mechanical changes of speed for the main spindle. These levers are located on the head within easy reach of the operator. A hinged cover permits examination of the gearing.

The driving motor is mounted on an extension of the bed in front of the head. The motor is rated at 50-horsepower with a speed range of from 500, to 1500 revolutions per minute, giving in connection with the mechanical speed changes, faceplate speeds from 0.24 to 24 revolutions per minute. The motor may be started, stopped on dynamic brake, reversed, or any speed within its range obtained by a handwheel mounted on the carriage operating the master switch of the automatic controller by a shaft along the front of the bed. The tailstock has a long and wide bearing on the bed in addition to the eight base clamping bolts giving usual security against shifting loads. The upper portion carries a large forged steel spindle adjustable by a screw and nut operated by a shaft and reducing gearing from a handwheel located across the end of the tailstock nearest the work.

The tailstock has a power transverse along the bed by a reversible motor which drives gears engaging the feed rack in the bed. The tool carriage extends entirely across the bed and has a central depression in which is fitted a removable track. An independent motor and controller mounted on the carriage is used for rapid transverse of the carriage in either direction. The bed is 11 feet wide and the face plate 12 feet in diameter.

Refractory Makers Elect Association Officers

Frank R. Valentine, president of M. D. Valentine & Bro. Co., Woodbridge, N. J., was elected president of the Refractories Manufacturers' association, which held its annual convention at the Vanderbilt hotel, New York, March 21-23. J. M. McKinley, president of the Crescent Refractories Co., Curwensville, Pa., was elected vice-president; C. C. Edmunds, of the McLain Fire Brick Co., Pittsburgh, was elected treasurer; George H. Diack, of the Queens Run Refractories Co., Inc., Lock Haven, Pa., and Charles E. Kapitzky, of the National Fire Brick Co., Cleveland, were elected members of the executive committee to serve three years, and J. J. Brooks Jr., of the Harbison-Walker Refractories Co., Pittsburgh, was elected to the executive committee to serve one year. Frederic W. Donahoe was re-elected secretary.

Coke Production Makes a Sharp Gain

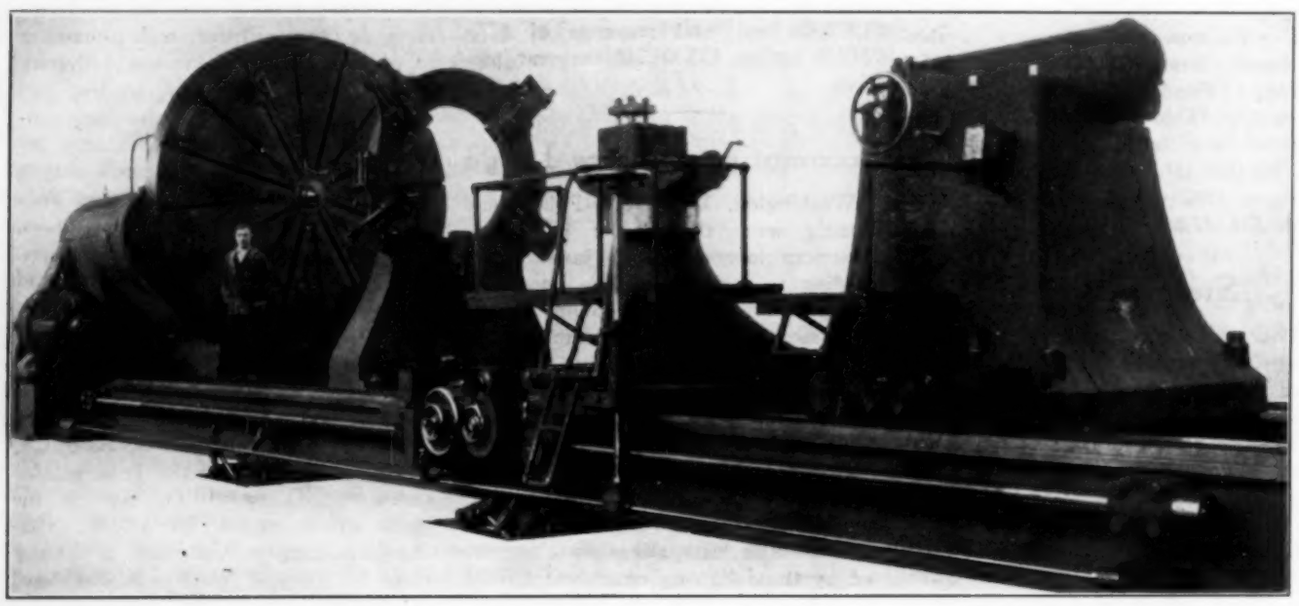
Washington, March 26.—The production of beehive coke during the marked recovery from the slump of the preceding week. The total output estimated from reports of cars loaded and from reports of producers, is placed by the geological survey at 409,000 net tons. This compared with 382,000 net tons one week before. The increase was chiefly in Pennsylvania production. The daily average output in the week ended March 17 was 68,000 tons against 25,000 tons one year before. The comparative productions estimates by districts follows:

	—Week Ended— Mar. 17, 1923	Mar. 10, 1923 (a)	Mar. 18, 1922
Pennsylvania and Ohio	330,000	302,000	118,000
West Virginia	25,000	24,000	9,000
Alabama, Kentucky, Tennessee and Ga.	24,000	25,000	9,000
Virginia	18,000	18,000	6,000
Colorado and New Mexico	7,000	8,000	3,000
Washington & Utah	5,000	5,000	4,000
United States total	409,000	382,000	149,000
Daily average	68,000	64,000	25,000

(a) Revised from last report.

Bituminous coal output continues to run about 10,500,000 tons weekly, according to the survey. The production for the week ended March 17 was 10,425,000 tons and the record for the week ended March 24 was about the same, it is estimated.

Books have been closed on the offering of $7,500,000 10-year 6 per cent sinking fund debenture bonds of the American Chain Co., Inc., Bridgeport, Conn., with the issue heavily oversubscribed. The bonds were offered at 97½ and accrued interest to yield 6.3 per cent.



VIEW FROM TAILSTOCK OF NEW HEAVY ENGINE LATHE BUILT TO ACCOMMODATE LARGE WORK

National Policy

Planned for Transportation System—Freight Continues Heavy

Washington, March 27.—Transportation continues to hold the center of the stage even though congress has adjourned and the Cummins-Esch or transportation act is assured of a tenure of at least nine months more before congress begins to tinker with it. Administration leaders with the President in Florida have announced that drastic amendments, all of them of a strengthening character, will be introduced as soon as congress convenes next December. Senator Smith W. Brookhart, of Iowa, already has framed his act to squeeze $7,000,000,000 worth of alleged water out of the railroads to completely rewrite the rate-making powers of the interstate commerce commission, and disembowl the act generally. The chamber of commerce of the United States, which has announced its intention of making a broad-gage study of the transportation system with the idea of formulating a national transportation policy, has three committees organized and at work and two more committees in process. A. H. Swayne, vice president of the General Motors Corp., is chairman of the committee on highway and motor transport. Carl R. Gray, president of the Union Pacific railroad, is chairman of the committee on consolidations. W. J. Clause, chairman of the board of the Pittsburgh Plate Glass Co., heads the committee on the co-ordination of rail and waterway service. The two committees still in the offing are those on the readjustment of relative freight rate schedules, of which Fred Delano, formerly of the federal reserve board, is chairman, and on governmental relation to transportation, headed by George A. Post, president of the George A. Post Co. The general committee in charge of the study will not be named until the return of Julius Barnes, president of the chamber, from the international chamber of commerce meeting at Rome. The report of the committees, which will be consolidated in one finding, probably will be put forward as an offset to the radical legislation threatened by radical-farmer members of congress.

The setting up of the National Transportation institute in Washington and Chicago is another mark of recognition of the urgency of the problem. E. E. Clarke, former chairman of the interstate commerce commission, is chairman of the institute and Representative Sydney Anderson, of Minnesota, is vice chairman. The institute will set up a bureau of research.

The railroads, meanwhile, are handling a record-breaking volume of freight. In the week ended March 10 the American Railway association reports the loading of all classes of freight totaled 905,219 cars, a drop of 12,000 cars from the preceding week because of severe weather conditions in the North, but 85,000 more cars than were handled in the same week of 1922 and 205,000 more cars than in the same week of 1921. In the first eight days of March the car shortage averaged 79,270 daily, with an offsetting surplus of 13,229 cars.

Between Jan. 1 and March 1, the railroads put in service 25,866 new freight cars and ordered 102,912 cars. Locomotive deliveries in January and February totaled 589 and orders in the same period 1945. Of the 25,866 new freight cars placed in commission, 11,319 were box cars, 9717 coal cars and 1748 railroad-owned refrigerator cars. The cars ordered included 49,220 box cars, 35,989 coal cars and 4012 railroad-owned refrigerator cars.

J. F. TOWNSEND

Scales Value Drops in 1921

Washington, March 27.—Manufacturers of scales and balances in 1921 turned out a product valued at $15,885,000, compared with $20,641,000 in 1919 and $9,734,000 in 1914, the census bureau states. The cost of raw materials used by the industry was $4,716,000 in 1921, $6,994,000 in 1919 and $3,174,000 in 1914. The number of persons engaged in the industry was 4852 in 1921, 6821 in 1919 and 5491 in 1914.

Obituaries

J. FRED TOWNSEND, aged 63, traffic manager of the National Tube Co., Pittsburgh, and one of the leading authorities on traffic matters in the steel industry, died March 22 at his home in that city. He was born in Cleveland and located in Pittsburgh 25 years ago. For several years he was connected with the old Wheeling & Lake Erie railroad as general freight agent. Since Nov. 1, 1899, he has been traffic manager of the National Tube Co. He was a director of the Bertha Coal Co. and the Consumers' Fuel Co. Mr. Townsend was a member of the Duquesne club, a director of the Americus club, and former president of the Pittsburgh Traffic club.

Eugene L. Howe, president of the Standard Malleable Iron Co., Muskegon, Mich., died several days ago after an illness of more than two months. He was 65 years old.

William Henry Edwards, who for 55 years was secretary of the Orr & Lockett Hardware Co., died March 22 at his home at Winnetka, Ill. He was 78 years old.

Timothy J. Dwyer, superintendent of the Semet-Solvay Co.'s coke plant, at Detroit died recently. He was 45 years old. He was born in Syracuse, N. Y., and entered the services of the Solvay Process Co., at an early age.

George Westerman, for many years connected with the Sharon Iron Co., Sharon, Pa., and the Westerman Iron Co., Lockport, N. Y., died at his home in Medford, Mass., March 23. He was 65 years old, and was the son of James Westerman, a pioneer steel manufacturer in the Shenango valley.

Abraham Lincoln Pryor, who served the Kearney & Trecker Corp., Milwaukee, as purchasing agent since the institution was founded in 1898, died March 20 from pneumonia. He was 60 years old and was born in Milwaukee. Mr. Pryor was one of the founders and vice president of the Milwaukee section of the National Association of Purchasing Agents and prominent in vocational training activities, having been secretary of the West Allis board of industrial education until his death.

The Hemphill Co., Central Falls, R. I., builder of machinery, has applied for the dissolution of the Hemphill Mfg. Co., the Spartan Needle Co., and the Banner Needle Co., Providence, R. I.

Brake Shoe Will Build New Plants

Net profits of the American Brake Shoe & Foundry Co., for 1922 amounted to $2,120,529 after charges depreciation and taxes against $1,320,271 in 1921. The improvement in earnings was a direct reflection of betterment in the railroad situation. President Joseph B. Terbell informed stockholders that two new plants have been authorized, one to be constructed at Houston, Tex., and the other at Portsmouth, Va. These plants will be completed before July next, it is expected. The company's balance sheet disclosed an increase in net current assets of $2,028,397. The income account follows:

	1922	1921	1920
*Net profit	$2,120,539	$1,329,371	$2,584,593
Interest	.....	9,100	12,745
Net increase	$2,120,539	$1,320,271	$2,571,848
Sub. cos. divs.	216	110	3,835
Pfd. divs.	667,724	664,024	626,247
Com. divs.	620,496	609,401	748,693
Lib. bond loss	.....	.....	337,132
Contingent res.	.....	.....	.....
Surplus	$832,103	$46,736	$855,941

*After depreciation and estimated federal taxes.

In his remarks to stockholders President Terbell said: "The year 1922 showed continued improvement throughout, and in the latter part your plants were being operated at capacity. This condition still continues, and unless there is an unexpected change in general business conditions, profits for the current year should equal those of last."

Favorable Business Seen For Refractories

Favorable business is forecasted for the current year by Chairman H. W. Croft, of the Harbison-Walker Refractories Co. Present business is about 75 per cent of capacity and this rate will be maintained during 1923, it is predicted. The surplus profit for 1922 was $803,571 against $60,539 in 1921. During 1922 operations averaged 60 per cent of capacity. The company has reduced its preferred stock from $9,600,000 to $3,000,000. Current assets totaled $6,577,677 against $5,009,477 one year before. Accounts receivable increased from $1,569,583 at the close of 1921 to $2,830,403 last December.

More Firms Raise Wages

The Andrew Terry Co., Terryville, Conn., maker of malleable iron castings, has given its employes an increase in wages, effective March 19. Pieceworkers receive 10 per cent, day workers 25 cents additional per day, and women 20 cents. The Wickwide Spencer Steel Corp. has made a readjustment of rates in the wire screen department of its Clinton, Mass., works.

Approximately 260 machinists employed by the Chapman Valve Mfg. Co., Indian Orchard, Mass., struck March 19 because of the refusal of the company to substitute a flat wage increase of 25 per cent for the present bonus system. The company offered to consider an increase in wages, but refused to abolish the bonus system.

Form Mayville Iron Co.

The Mayville Iron Co. was incorporated with an authorized capital of $50,000 by Walter E. Meub, W. J. Morris, W. N. McDonald, officers of the Youngstown, O., and C. A. Manchester and I. A. Manchester, general counsel for Sheet & Tube of America. The new concern has been formed in preparation of taking over the properties of the Steel & Tube Co. of America at Mayville, Wis., when and if possible to do so. The Mayville properties consists of two blast furnaces, ore mines, by-product coke plant, water and timber rights, electric power and light franchises and a stock farm.

Sharon Hoop Re-elects

Severn P. Ker has been re-elected president of the Sharon Steel Hoop Co., Sharon, Pa. Other officers re-elected at the meeting of the directors held in Pittsburgh Tuesday, March 20, follow: Vice presidents, Harry T. Gilbert and T. P. Draper, both of Sharon, and L. W. Smith of Pittsburgh; secretary-treasurer, J. Reid Evans. President Ker says prospects are bright for continuous operation of both the Sharon and Youngstown plants for several months. It is said the company has earned at the rate of $3 per $50 par value common share in the first quarter and indications are this rate will be bettered in the second quarter. The company has not paid dividends for some time. There are many inquiries for the stock and the last that change hands was at an advance of 1¼ points over the last previous sale.

A voluntary petition in bankruptcy has been filed by the F. R. Lueck Mfg. Co., Milwaukee, manufacturing wrenches, tools, dies, etc. The concern was founded about three years ago by Frank R. Lueck. It reports assets of $30,018 and liabilities of $28,992. Unsecured liabilities are $28,721.

Prices Steady

In By-Products Market—Oil Distillate Production Highest in Months

New York, March 27.—Supplies of ball and flake naphthalene are scarce with the market slightly higher. Balls are now quoted at 10 cents, works, and flakes at 9 cents, some smaller spot lots now being available at these prices. Demand is not active but is expected to improve shortly when the cleaning season sets in and the drug trade usually comes into the market for last minute requirements.

It appears that much the same situation prevails in sulphate of ammonia where prices, despite a slowing up in demand, recently advanced on domestic business to a range of $2.20 to $2.25 works. The export market on sulphate of ammonia, however, continues easy at nominally $3.60 to $3.65 port, in double bags.

A normal demand prevails for light oil distillates, with prices steady as follows: Pure benzol, 30 cents works in tanks and 35 cents in drums; 90 per cent benzol, 27 cents in tanks and 33 cents in drums; toluol, 30 cents in tanks and 35 cents in drums; solvent naphtha, 27 cents in tanks and 32 cents in drums; pure xylol, 30 cents in tanks and 35 cents in drums; and commercial xylol, 26 cents in tanks and 34 cents in drums. The market on phenol is steady at 24 cents works.

Production in light oil distillates is the highest in months, averaging around 85 per cent or normal capacity. While sellers are still engaged in covering on back orders and the scarcity of tank cars continues, a fair amount of spot material is available to the track at the present time.

Coke Oven By-Products

Spot

Per Gallon at Producers' Plants in Tank Lots

Pure benzol	$0.30
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.24
Naphthalene flake	nominally 0.09
Naphthalene balls	nominally 0.10

Per 100 Pounds at Producers' Plants

Sulphate of ammonia	$3.20 to 3.25

Contract

Pure benzol	$0.30
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.24
Naphthalene, flake	nominally 0.09
Naphthalene balls	nominally 0.10

Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields

LEWIS E. SKINNER, who has been connected with Joseph T. Ryerson & Son. Inc., Chicago, for the past 18 years, has been placed in charge of the Cincinnati Iron & Steel Co. plant at Cincinnati, which was acquired by the Ryerson organization. Mr. Skinner is well known in iron and steel circles. For a number of years he was in charge of the Ryerson company's Ohio business. Mr. Skinner will be assisted by C. A. Parnell, former assistant to Arthur Allshul, manager of the company's Buffalo plant.

Moses Taylor, former president of the Lackawanna Steel Co., Buffalo, on March 20 started on a European trip.

S. E. Doane, engineer of the National Lamp Works of the General Electric Co., Cleveland, recently sailed on a European business trip.

C. G. d'Ugglas has been placed in charge of the Detroit office of Williams, White & Co., Moline, Ill., recently opened at 623-625 Majestic building.

Frank A. Scott, president of the Warner & Swasey Co., Cleveland, plans a European trip beginning the latter part of April.

C. A. Dunn, formerly sales representative for the Prime Mfg. Co., has been appointed manager of sales for the Weldless Tube Co., Wooster, O.

Reginald W. Millard, who resigned recently as president of Foster, Merriam & Co., Meriden, Conn., has been placed in charge of Canadian business for the W. B. Richards Co., industrial engineer.

J. W. Fellmuth, superintendent of the Marion Steam Shovel Co., Marion, O., will resign his position April 1 to devote his entire time to a new construction company.

J. S. Marlowe has been appointed district sales manager in the Indianapolis territory, for the Atlas Steel Corp., Dunkirk, N. Y. His offices are at 914 Roosevelt building, Indianapolis.

F. L. Pierce, treasurer of the Cutler-Hammer Mfg. Co., Milwaukee, has been elected first vice president of the company. He continues as treasurer.

William H. Gorman, formerly connected with the Aluminum Co. of America, Pittsburgh, now is affiliated with the William M. Orr Co., Pittsburgh, in a sales capacity.

Samuel Mather, senior member of Pickands, Mather & Co., Cleveland, has been elected a director of the Bankers Trust Co., New York, to fill the vacancy

LEWIS E. SKINNER

caused through the death of Nicholas Biddle.

Hunter Michaels has been made sales agent of the Railway Steel Express Co., Chicago, succeeding D. B. Fulton. He formerly was advertising manager of the Union Metal Products Co., Chicago.

A. A. Taylor has resigned as manager of the railroad division of Fairbanks, Morse & Co., Chicago, to become vice president and general manager of the Locomotive Firebox Co., Chicago.

F. H. Maloney, formerly commercial agent of the Mississippi Warrior River Service, Chicago, has been appointed general agent of the railroad department of the Truscon Steel Co., Youngstown, O. His headquarters will be at St. Louis.

Fred H. Dorner has been appointed sales representative for the Standard Turbine Corp., Wellsville, N. Y. His headquarters will be at 548 Milwaukee street, Milwaukee. Leonard G. Paine, 806 Otis building, Philadelphia, also was appointed a sales representative for the company.

E. V. Coulston, who has been connected with the Rock Island Stove Co., Rock Island, Ill., for 12 years as secretary and sales director, on May 1 will become general manager of the Ideal Bronze Co., Cleveland. He has been active in the stove and furnace business in the Middle West for the past 20 years.

Harry H. Holloway, superintendent of the Thomas plant of the Youngstown Sheet & Tube Co., Youngstown, O., has resigned that position, effective April 1. It is understood he has accepted a position with the Apollo Steel Co., Apollo, Pa., as assistant to the president.

Fred Cordes, formerly connected with J. H. Williams Co., Brooklyn, N. Y., has joined the staff of the Western Drop Forge Co., Marion, Ind., as has F. W. Davis, also formerly connected with the Williams company. Mr. Davis has taken charge of the Western company's cost accounting department.

Charles R. Meissner, formerly connected with the Koppers Co., Pittsburgh, in the capacity of experimental engineer, has been appointed superintendent of the coke plant now being built by the Weirton Steel Co. at Weirton, W. Va. It is expected the plant will be ready for operation about July 1.

Dr. Ira N. Hollis, for the past 10 years president of the Worcester Polytechnic Institute, Worcester, Mass., has resigned that position, to take effect before his seventieth birthday, March 7, 1926. Dr. Hollis is a past president of the American Society of Mechanical Engineers. He plans to devote his time to literary work after leaving the presidency.

R. D. Love, who has been manager of sales for the Warren Iron & Steel Co., Warren, O., resigned that position to become vice president of the Betz-Pierce Co., Cleveland, iron and steel jobber. Prior to joining the Warren Iron & Steel Co., Mr. Love was connected with the United Alloy Steel Corp., Canton, O., in a sales capacity. For

seven years prior to 1918 he was connected with the Betz-Pierce Co. to which he now is returning.

Charles F. Lederer has been appointed general superintendent of rail welding for the Metal & Thermit Corp., New York. He has been connected with the rail welding department of the company for more than two years and formerly was superintendent of way for the Milwaukee Electric Railway & Light Co., Milwaukee, serving that company for a period of 12 years in its track department. In his new position he will have entire charge of all technical work in the rail welding field.

C. R. Lewis, formerly general manager of sales of the Standard Forgings Co., Chicago, was named vice president of the company at its recent annual meeting. Before joining the Standard organization in February, 1917, Mr. Lewis was connected with the freight traffic department of the New York Central railroad for 21 years. Laurence C. Ryan, who has been with the Standard company for 17 years, several of which he served as treasurer, also was made a vice president of the firm. However, he will also continue as treasurer.

D. O. Wolf has been appointed sales manager of the Apollo Steel Co., Apollo, Pa., to succeed C. L. Pollock, who resigned Feb. 1. Except for 18 months' war service, Mr. Wolf has been with the Apollo company continuously, for four years as assistant manager in the company's Philadelphia office, and the past four years in the home office as assistant to Mr. Pollock. Mr. Wolf is a graduate of Lafayette college. James H. Hughes, who succeeds Mr. Wolf as assistant sales manager, recently was connected with the Timken Roller Bearing Co., and previously was with the Carnegie Steel Co. in its Cleveland office.

Paul A. Collins, formerly Washington representative of the Automatic Electric Co., Chicago, has been appointed assistant manager of the P.A.X. department of the North Electric Mfg. Co., Galion, O. He resigned his position with the former company March 1. After graduating from Harvard, Mr. Collins spent twelve years in telephone work. He resigned in 1914 due to ill health and went to Boston. Later he was placed in charge of sales for the Automatic Electric Co. in the New England states. After serving in the Signal corps of the army during the war, he resumed his former position. From 1919 to 1921 he handled sales and engineering methods in the New York office of the Automatic company and during 1922 conducted all negotiations for his company with the government.

A. C. McKinnie, general sales manager of the Stanley Works, New Britain, Conn., is seriously ill with pneumonia at his home in that city.

Fred W. Moore, president and treasurer of the Millbury Steel Foundry Co., Millbury, Mass., has resigned as agent of the Cordis Mills in that town, a position he has held for 32 years.

Charles DeBardeleben, Birmingham, Ala., has been elected president of the Alabama Fuel & Iron Co. He has been vice president and general manager of the company for years.

Frans H. C. Coppus has been elected president, Otto Wechsberg vice president and J. Verner Critchley managing director of the Coppus Engineering Corp., Worcester, Mass.

FRANK R. VALENTINE
Who Has Been Elected President of the Refractories Manufacturers Association

L. S. Kerchner and R. M. Marshall have been appointed representatives in the Pittsburgh territory for the Gellert Engineering Co., Philadelphia. The company recently opened an office in the Oliver building, Pittsburgh.

Charles T. Main, a Boston mill engineer, and former president of the American Society of Mechanical Engineers, has been named by the Associated Industries of Massachusetts chairman of a commission to make a survey of unutilized water-powers in New England.

Emile Ramas, president of the Association Technique de Fonderie de France, expects to visit the United States in April to attend the annual meeting of the American Foundrymen's association at Cleveland. The purpose of Mr. Ramas' trip is to invite American foundrymen to the international foundrymen's congress in Paris in September. Mr. Ramas is director of the Societe Francaise Metallurgique (Procedes Griffin), 2 Rue de Constantinople, Place de l'Europe,

E. Donald Jerome has been appointed to the pig iron sales department of Crocker Bros., in the New York territory. Mr. Jerome for six years was with the pig iron selling department of the Bethlehem Steel Co. and more recently New England representative of the Pulaski Iron Co.

Peter J. F. Batenburg has resigned as chief engineer of the Mitchell Motors Co., of Racine, Wis., which is undergoing a financial reorganization. He came from Europe in 1909 to become chief engineer of the Four Wheel Drive Auto Co., at Clintonville, Wis. At the close of the war he joined the Mitchell organization.

H. S. Vrooman, who has been in the molding sand business at Chicago the past 30 years, has been appointed representative of the Garden City Sand Co., Chamber of Commerce building, Chicago, to handle its Wisconsin business. His office will be in the Hotel Wisconsin, Milwaukee. Mr. Vrooman began his work in molding sand with the Garden City Sand Co. and later was in business for himself, now returning to his first connection.

Paul C. Rogers has been elected vice president of the Phoenix Iron Works Co., Meadville, Pa. Mr. Rogers was New York district sales manager for the company. He has been succeeded at New York by J. J. Shipherd, formerly district sales manager at Dallas, Tex. K. B. Thorndike, who has been the company's sales manager at Tulsa, Okla., hereafter will have charge of the Dallas office as well.

F. J. Griffiths who has been elected president of the Central Steel Co., Massillon, O., for a number of years following the organization of the company in 1914, was vice president and general superintendent. He is a graduate of the Case School of Applied Science. He first became connected with the steel industry when he became identified with the United Steel Co., Canton, O., shortly after graduating from college. He remained with this company until the formation of the Central Steel Co. Other changes in the Central organization include the election of R. E. Bebb former president, as chairman of the board of directors; C. E. Stuart, vice president and treasurer; J. M. Schlendorf as vice president in charge of sales; B. F. Fairless, as vice president in charge of operations; and C. C. Chase Jr. as secretary. Mr. Schlendorf and Mr. Fairless also were added to the board of directors of the company

Tin Plate Mill Wages Compared

Average Hourly Earnings of Workers in Representative Mills in 1922 Was 75 Per Cent Above 1913, Bureau of Labor Statistics Reports—Reduction of 31 Per Cent from Peak—Changes Given in Detail

AVERAGE hourly earnings of employes in representative tin plate mills of the United States in 1922 were 99 per cent higher than in 1910, and 75 per cent above the average paid in 1913, according to a summary of a survey made by the department of labor through the bureau of labor statistics. The average for 1922 showed a decrease of 31 per cent from that of 1920, when earnings were at the peak. Averages of fulltime weekly earnings have about the same relationship to one another. Such earnings in 1913 were 72 per cent over the average for 1913.

Average customary fulltime hours in 1922 showed a decrease of 4 per cent from 1910 and of 1 per cent from 1920. Index numbers for customary fulltime hours, hourly earnings and fulltime weekly earnings in the tin plate industry, based on figures for 1913 equaling 100, are as follows:

	Customary fulltime hours per week	Earnings per hour	Fulltime weekly earnings
1910	98	88	87
1911	99	98	97
1912	99	99	98
1913	100	100	100
1914	100	102	102
1915	100	102	101
1919	97	220	217
1920	95	252	253
1922	94	175	172

Figures were obtained by the bureau of statistics from nine plants in 1922, and the foregoing index was computed from a combination of the data for the principal occupations as presented in the accompanying table. The number of plants from which figures were examined was not the same each year, varying from five in 1910 to as many as 11 in 1914.

Changes in hourly and fulltime weekly earnings of those engaged in the various occupations show considerable variation from the averages. Weekly earnings of rollers in 1920 averaged $72.63, compared with $108.54 in 1920 and $48.59 in 1913. Roughers' average weekly wages decreased from $58.21 in 1920 to $38.17 in 1922; catchers' from $51.95 to $34.84; doublers' from $70.69 to $44.62; heaters' from $73.51 to $49.96; shearmen's from $56.52 to $40.86; tinners' from $47.85 to $34.47; redippers' from $66.26 to $44.26, and laborers' from $32.19 to $21.32. Wages of laborers in 1913 were $11.64.

The average fulltime hours per week of rollers, roughers, catchers and heaters in the nine years for which data were compiled was 42.7, while for those engaged in other occupations the average was higher, in the case of laborers going as high as 64.3 in 1919. The bureau of statistics did not compile similar statistics relating to hours and wages in tin plate mills for the years 1916, 1917 and 1918. The data for other years going back to 1910, classified according to employes' occupations, are given in the accompanying table.

Tap and Die Interests Are Consolidated

Boston, March 27.—Official announcement of the consolidation of three Massachusetts manufacturers of tap and die and similar products has dated company, known as the Frank O. Wells Co., Inc. gives the following announcement:

"The American Tap & Die Co., Greenfield, Mass., the Williamsburg Mfg. Co., Williamsburg, Mass., and the Frank O. Wells Co. of Greenfield, Mass., have voluntarily consolidated. The Frank O. Wells Co. brings to the consolidation an extensive line of thread cutting tools, reamers, counterbores, broaches, broaching machines, and tap and drill grinding machines. The American Tap & Die Co., which succeeded in 1920 to the business of Nichols Bros., now manufactures a line of standard screw cutting tools and cutlery and supplies. The Williamsburg Mfg. Co. manufactures screw drivers, hack saw frames and blades, and miscellaneous tools and hardware articles. The consolidation brings Frank O. Wells again into active contact with the tap and die industry. In 1876 he, together with his brother, started in manufacturing taps and dies with a joint capital of $1100. This same business gradually developed until in 1912 it was valued at $3,000,000. Financing during this development was entirely from the earnings. In 1912 Mr. Wells organized the Greenfield Tap & Die Corp., of which he was president up to the time of his resignation in 1919. Since that time he has been devoting his energy to the perfecting of tap and die tools. He is an active member of engineering societies and it was at his instigation that the national screw thread commission was appointed by congress for tools standardization. He now becomes president and consulting engineer of the new company of which L. E. Peck is vice president and general manager. A. B. Allen is secretary and treasurer."

Directors of the company are the officers and William B. Kieth, U. S. Howe, F. L. Putnam, J. Lyman Pratt and Graydon Stetson.

The Silvertown Cycle Mfg. Co., Worcester, Mass., has filed a voluntary petition in bankruptcy with liabilities of $16,365.91, practically all of which is unsecured to 75 creditors, and assets of $2756.78.

Tin Plate Wage Changes by Occupations

First column, under each occupation, gives average full-time hours per week. Second column, average earnings per week. Third column, average full-time weekly earnings.

	Rollers			Doublers			Tinners	
1910	42.7	$1.025	$43.73	42.7	$0.632	$26.97	42.9	$0.042	$17.27
1911	42.7	1.100	47.33	42.7	0.706	30.13	43.0	0.429	18.48
1912	42.7	1.097	46.82	42.7	0.677	28.90	43.4	0.444	19.28
1913	42.7	1.139	48.59	42.7	0.740	31.58	43.6	0.433	18.84
1914	42.7	1.115	47.59	42.7	0.734	31.32	43.5	0.442	19.22
1915	42.7	1.106	47.17	42.7	0.718	30.63	43.3	0.442	19.13
1919	42.7	2.248	95.99	42.7	1.408	60.12	43.0	0.977	42.01
1920	42.7	2.542	108.54	42.7	1.655	70.69	42.9	1.114	47.85
1922	42.7	1.701	72.63	42.7	1.045	44.62	43.3	0.796	34.47
	Roughers			Heaters			Redippers	
1910	42.7	0.425	18.14	42.7	0.648	27.63	46.2	0.570	26.56
1911	42.7	0.507	21.63	42.7	0.714	30.47	47.2	0.619	29.32
1912	42.7	0.513	21.89	42.7	0.675	28.78	55.0	0.592	32.58
1913	42.7	0.533	22.73	42.7	0.679	28.99	53.0	0.536	28.03
1914	42.7	0.560	23.87	42.7	0.752	32.10	53.0	0.538	28.55
1915	42.7	0.562	23.96	42.7	0.725	30.95	51.4	0.563	28.81
1919	42.7	1.193	50.94	42.7	1.458	62.26	46.9	1.272	59.66
1920	42.7	1.363	58.21	42.7	1.722	73.51	43.1	1.538	66.26
1922	42.7	0.894	38.17	42.7	1.170	49.96	43.1	1.027	44.26
	Catchers			Shearmen			Laborers	
1910	42.7	0.427	18.23	52.7	0.497	25.68	60.6	0.165	9.97
1911	42.7	0.487	20.79	52.8	0.555	28.72	61.0	0.164	10.01
1912	42.7	0.403	17.20	51.8	0.573	29.00	61.6	0.167	10.32
1913	42.7	0.463	19.74	56.5	0.485	27.34	61.6	0.189	11.64
1914	42.7	0.468	19.95	56.9	0.468	27.61	62.4	0.189	11.78
1915	42.7	0.489	20.87	57.3	0.514	29.55	61.6	0.190	11.72
1919	42.7	1.014	43.30	48.3	1.368	66.07	64.3	0.461	29.64
1920	42.7	1.217	51.95	44.1	1.280	56.52	60.5	0.533	32.19
1922	42.7	0.816	34.84	44.7	0.914	40.86	59.4	0.359	21.32

May Dispose of Surplus

Washington, March 27.—The navy department has obtained from 7.775 cents to 8.21 cents per pound for the 1,930,000 pounds of surplus zinc plates upon which it opened sealed bids March 19. The awards comprise 100,000 pounds at 7.95 cents and 50,000 pounds at 8.21 cents to the Federal White Metals Co., New York; 750,000 pounds at 7.82 cents and 872,000 pounds at 7.86 cents to the Union Smelting & Refining Co., Newark, N. J.; 150,000 pounds at 8.2 cents to James P. Cattee & Bros., Philadelphia; and 11,500 pounds to Richard & Co., Boston, at 7.775 cents.

The navy has awarded 5,000,000 pounds of surplus copper ingots, of No. 1 ingot grade, to Marvin & Co., New York, at 17.026 cents per pound. Two lots of copper billets, aggregating 1,109,513 pounds, were awarded to the Bridgeport Iron & Metal Co., Bridgeport, Conn., at 17.0396 cents per pound. Bids on this surplus copper were opened on March 22.

Will Argue Cost-Finding Case in Fall Term

Washington, March 27.—Owing to the short time lapsing before the adjournment of the United States Supreme Court for the summer, and the crowded condition of the docket, the Claire furnace iron, steel and coke cost-reporting case cannot be argued before the fall term. The federal trade commission had hoped to argue the case this spring, thus making possible before the end of the year a final decision as to its authority in cost reporting. In both the district supreme and district appellate courts the commission has lost, and the case has been in the courts almost three years.

The commission has filed assignments of error in the Maynard coal cost-reporting case, thus completing the appeal of that case to the district appellate court. The district supreme court, as it did in the Claire furnace case, held the commission without authority to exact monthly production cost reports from coal operators and issued a permanent injunction.

The Kelsey Wheel Co., Detroit, reports net profit for 1922 of $1,801,512, equivalent to $16.23 a share on the common stock, compared with $1,792,068, or $16.06 in 1921.

Average of Wages Near Peak of 1920

WASHINGTON, March 27.—February wage and employment statistics for the iron and steel industry as compiled by the bureau of labor statistics, department of labor, reveal wages ascending at a more rapid pace than volume of employment. Reports received from 187 iron and steel works for February and January place February employment at 223,615 persons, compared with 217,303 in January, a gain of 2.9 per cent. For a one-week period, February payrolls totaled $6,308,584 and January payrolls $5,968,489, an increase of 5.7 per cent in amount of payrolls.

Setting February this year against February last year gives a more vivid comparison. The 108 iron and steel works that were employing 119,463 persons last February were employing 157,430 this February. For a one-week period, payrolls in February, 1922 totaled only $2,364,429 and this February $4,365,120. Thus, February, 1923, saw employment in the iron and steel industry 31.8 per cent greater than in February, 1922, while payrolls this February had increased 84.6 per cent.

Average wages are almost up to the high 1920 levels. The average wage paid in the iron and steel industry in February was $122.24. In February, 1922, the average was $85.58 and in February, 1920, it was $129.70. The February average is an advance of $2.82 over January. Per capita wages in February in the industry were 2.7 per cent greater than they were in January, the bureau states. Seventy-one per cent of the iron and steel plants reporting for February were operating full time, 21 part-time and eight were idle.

Forty-three industries figured in the February survey of the bureau. All but 11 reported heavier employment than in January and all but nine larger payrolls. The automobile industry reported its employment in February as 9.1 per cent greater than in January and its payrolls 20.8 per cent larger. In the agricultural implement industry the gain in personnel was 12.3 per cent and in payrolls 15.1. Car building and repair shops lost 2.5 per cent in employes and 0.5 per cent in payrolls. Foundries and machine shops added 3.9 per cent to their employes and 6.2 per cent to their payrolls. Hardware plants reported 1.6 per cent more employes and 8.4 per cent heavier payrolls.

The automobile industry led in per capita wage increases in January, with 10.7 per cent. Hardware plants were second with 6.6. The increase per capita in foundries and machine shops was 2.2, in agricultural implement works 2.4 and in the electrical-machinery industry 1.2. In the steel shipbuilding industry a decrease of 0.4 per cent developed.

Eighty-six per cent of foundries and machine shops were running full time in February, 95 per cent of the car building and repairing works, 100 per cent of the hardware plants, 92 per cent of the automobile builders and 94 per cent of the steel shipyards.

Average Monthly Wages in Iron and Steel Industry, and Number of Employes

	Number of establishments	Number of employes	Payroll for half month	Average wage per month	Average wage year previous
February	187	223,615	$13,668,599	$122.24	$85.58
January	184	217,303	13,032,701	119.42	78.70
December, 1922	133	195,602	11,860,426	121.06	89.32
November	132	185,488	11,036,241	118.90	92.68
October	140	176,387	9,903,466	112.28	81.80
September	126	164,731	8,858,008	108.02	77.40
August	125	153,260	7,424,212	97.04	84.88
July	110	142,721	5,941,489	83.26	76.96
June	110	146,087	6,906,566	94.58	87.82
May	106	136,593	6,383,730	93.52	97.64
April	108	125,089	5,509,555	88.14	106.33
March	113	120,663	5,341,971	89.02	122.18
February	108	119,463	5,306,863	85.58	129.70
January	106	103,056	4,055,652	78.70	150.16
Averages:					
1922	118	147,882	7,378,535	98.78	.....
1921	114	117,223	5,869,438	100.12	.....
1920	105	172,318	13,015,883	151.06	.....
1919	105	154,244	9,989,098	128.22	.....
1918	97	180,859	10,734,114	118.74	.....
1917	97	180,088	8,327,492	92.49	.....

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

SEVERAL changes of officials were made at the annual meeting of the directors of the American Hardware Corp., New Britain, Conn., held March 8. Albert N. Abbe, secretary, and George P. Spear, assistant secretary, were made vice presidents, and George Hildebrandt was elected secretary and Joseph C. Andrews assistant secretary. Other officers were reelected. The directors are: Carlisle H. Baldwin, Philip Corbin, James S. Elton, B. A. Hawley, George T. Kimball, C. B Parsons, A. J. Sloper, C. F. Smith, H. C. M. Thomson, Harris Whittmore, R. S. Woodruff, Meigs H. Whaples and Morgan B. Brainard, Hartford, Conn., the latter being a new member of the board.

* * *

THE Springfield Malleable Iron Co., Springfield, Mass., a recently organized corporation, has purchased the former property of the Harley Co., in that city, from the Hendee Mfg. Co., and will operate it as a foundry. Some of the men behind the new company are also interested in the Arcade Malleable Iron Co., a subsidiary of the Baldwin Chain & Mfg. Co., Worcester, Mass.

* * *

THE Burlington Brass Works, Burlington, Wis., is installing a new 1500-pound furnace. Some new finishing and polishing machinery also is being purchased.

* * *

MANUFACTURE of piano plates is the purpose of the American Piano Plate Co., which has been incorporated in Wisconsin with a capital stock of $10,000 and headquarters at Racine, Wis. The incorporators are Walter F. Walker, Walter B. Mitchell and Milo J. Griffith.

* * *

MACOMB MACHINE Co. recently was organized at Waltham, Mass., with a plant at 230 Newton street. It will engage in business as engineer, machinist and manufacturer of textile and industrial machinery. It will have a Boston office at 52 Chauncy street. Directors of the company include James F. Monaghan and E. H. Jennison.

* * *

THE Wallace-Barnes Co., Bristol, Conn., has taken over the Dunbar Bros. Co., maker of springs in that city, the sale involving about $750,000. The latter company was incorporated in 1907. The plant will continue operations as usual as a division of the Associated Springs Corp., which was recently formed through the merger of five large spring makers.

* * *

THE Bryan Pattern & Machine Co., Bryan, O., manufacturer of patterns, has opened a foundry division devoted to the production of brass, bronze and aluminum castings. All equipment is installed and production is under way. It is the intention to specialize in small and medium nonferrous castings. The foundry has a daily melting capacity of 10,000 pounds. The pattern plant which was rebuilt following a fire in 1919, has over 25,000 square feet of floor space.

* * *

ADDITION of a building at the plant of the Timken Roller Bearing Co., Canton, O., is now nearing completion. The structure has 25,000 square feet of floor space. It is two stories and of fireproof construction. It will be fitted out with automatic screw and grinding machines.

* * *

THE Sterile Machinery Corp., Springfield, Mass., which was incorporated March 2, with $750,000 capital, has organized by the election of Abton C. Schmelzer, Longmeadow, Mass., as president and treasurer and William H. Toefert, Holyoke, Mass., vice president. The company plans to erect a factory and make sanitary soda fountain equipment.

* * *

WORD has been received from Huntington, W. Va., that the Riter-Conley Co., Pittsburgh, is low bidder for the construction of three steel barges for that district. These barges will be 26 x 80 feet, with a 5-foot draught. Construction and delivery of the barges to the United States repair station at Marietta, O., must be made within four months after award of the contract. The Riter-Conley Co.'s bid was $32,190.

* * *

SEALED bids are being asked until April 5 by the Milwaukee board of industrial education for equipping the power plant of the vocational school building, Seventh and Prairie streets, with a uniflow engine direct connected to a generator of 110-240 volts, direct current. The successful bidder is expected to complete the installation by July 14, 1923. Archie O. Muehl, 316 Seventh street, Milwaukee, is secretary of the board.

* * *

THE property of the American & British Mfg. Co., Bridgeport, Conn., will be offered at auction March 27. The real estate will be sold in one lot and the machinery and equipment separately. The company was petitioned in bankruptcy in Feb. 1921. It is a $10,000,000 corp. and built steam, oil and fire engines and general machinery. Both the Bridgeport and Providence, R. I., plants of the corporation have been idle about two years.

* * *

OFFICERS of the Homer Engineering Co., Canton, O., have been elected as follows: President, F. E. Homer; vice president, W. A. Bushong and secretary and treasurer, F. A. Carlisle. The company maintains completely equipped motor and machine shops and at present is installing a department for the design and manufacture of labor-saving machinery.

* * *

THE A. A. Wescott & Sons Co., Hopedale, Mass., maker of spindles, is to operate nights for the next two months on account of a rush of orders. The company was incorporated Jan. 6 with $30,000 capital, the officers being: President, Asa A. Wescott; treasurer, Hattie A. Wescott; secretary, Roy E. Wescott.

* * *

REPLACEMENT of the present frame building of the Northern Boiler & Structural Iron Works at Appleton, Wis., with a brick and steel shop, which was projected about two years ago, will now be started, due to the improvement in business and lack of capacity to handle all requirements. The shop will be 60 x 120 feet, and will be erected over the present shop so that work may not be interrupted. Two electric cranes and machinery for fabricating shapes, plates, sheets, etc., will be installed.

Tool Prices Continue To Advance

Higher Quotations Are Named by Several Machinery Builders—Buying Continues Limited to Single Tools—Railroads Still Ordering—Two Large Power Projects Place Heavy Machinery Requirements—Prospective Demand Encouraging

MACHINE tool prices continue to advance and in several instances now are on a par with the peak quotations of 1920. In some districts the higher prices are having an adverse effect on demand. In several instances large tool lists are known to have been pared down and any number of users who had been considering new tools have turned to the secondhand market. It is not thought prices will go any higher, at least for the present, as machine tool manufacturers fear the killing off of buyer confidence by too rapid price advances. However, even at the increased prices manufacturers are barely making a slight profit in view of the constantly increasing costs of labor, etc.

Generally demand for equipment is fair although principally for single machines. Here and there a large order is noted. The railroads continue active in the market and buyers of the past few days include the Norfolk & Western, the Hudson-Manhattan, and the New York Central. Prospective railroad demand is large. Inquiries are current from the Illinois Central, the Louisville & Nashville, and several other roads. The latter road also is expected to issue a new list for metalworking tools, while the Bessemer & Lake Erie is understood to be preparing one for issuance in the near future.

Probably the largest inquiry current from the general manufacturing trade is that of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., for 70 or 80 tools. The diversity of demand is indicated by the inquiries in the market, manufacturers of all kinds being actively inquiring. Included among those expected to buy tools shortly are the Titusville Forge Co., Titusville, Pa., and Fay & Egan Co., Cincinnati. The International Harvester Co., continues to enter the market from time to time as does the Studebaker Corp. Some interest is shown in machine tool circles in the report the latter company plans to erect a large plant at Detroit.

Electrical equipment demand is gaining. During the past few days two large orders for this class of equipment was placed for water power development projects. One, involving $1,500,000 of hydraulic equipment, was placed with the Canadian Allis-Chalmers Co. for a Canadian water power project, while the other, involving $250,000 of machinery and electrical equipment for a western power project, was placed with the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Railroad Machinery Purchases Still Feature

NEW YORK, March 27.—Award of approximately $80,000 of equipment by the Norfolk & Western railroad is an outstanding contract in the week's machine tool business. This business was distributed among several sellers and comprises the bulk of equipment recently issued by this railroad. Another railroad buyer is the Hudson-Manhattan, which has closed on five machine tools, and the New York Central, which continues to buy some equipment every week. Railroad buying in this district otherwise has been quiet, and in fact there have been few outstanding orders during the past week in any quarter. Nevertheless most sellers regard business as satisfactory. Following increases in raw materials and advances in wages in some quarters, prices continue to stiffen. Within the past week an advance of 20 per cent has been made in a line of radial drills, and increases of 10 to 20 per cent in two or three lines of grinders.

Crane activity, at least as far as new demand is concerned, appears less active than last week. A fairly good volume of orders is reported but inquiries have been scattered. This is particularly true in the case of overhead cranes. A leading overhead crane order of the past week calls for five 5-ton cranes and one 10-ton crane for the Birmingham, Ala., plant of the United States Cast Iron Pipe & Foundry Co.

Considering the crane market as a whole over the last month or so, there has been a good volume of business and sellers generally are in a better position than they have been in three years. The locomotive crane builders have now reached the point where their shop operations are normal, and with some sellers uncertain sizes are booked ahead two and three months.

Orders for Machine Tools Are Fair

PITTSBURGH, March 27.—Selling of machine tools and shop equipment continues fair. Many inquiries are held in abeyance, however.

One dealer sold two turret lathes to a local interest, while a third sold one or two lots of four or five items each, including regular machine shop equipment, together with several lots of one or two tools each. One sale of the latter type covered a universal milling machine and a large shaper. One used machinery seller disposed of two drill presses along with some small equipment. The Bessemer & Lake Erie railroad, which recently took prices on a face grinder, is understood contemplating the purchase of considerable heavy equipment for a locomotive repair shop at Greenville, Pa. The Westinghouse Electric & Mfg. Co.'s inquiry for second quarter requirements is out. It includes 70 or 80 items and on it are several machines carried over from the first quarter list which was not fully closed up because the quarter's appropriation fell short of total expenditures. This list includes such tools as radial drills, milling machines, saws, drill presses, grinders, etc., for East Pittsburgh and Homewood, Pa. plants. This interest is understood to have received the contract for the motors in connection with the ladle cranes, three of 125-ton capacity or-

dered this week by the Carnegie Steel Co., for its Duquesne works.

Foreign Inquiries More Numerous

CLEVELAND, March 27.—Several local machine tool manufacturers report they are entertaining more foreign inquiries than they have in some time. However, orders from abroad are slow to develop although they are more numerous. This, in some measure, is due to the fluctuations in exchange, and the many other factors which go toward hindering the normal resumption of business in Europe.

The domestic machine tool market is slowly but steadily gaining. While individual orders in the local market, still are limited to one machine in the majority of instances, the total make up a rather sizable volume.

Inquiry and Sales Are Increasing

CINCINNATI, March 27.—Inquiry for machine tools is increasing, as are sales. Both are scattered and principally involve single tools. With the steady improvement in business, there also is a growing shortage of skilled help. Most of the plants are putting on men, but the scarcity of skilled mechanics is causing the industry much concern. An outstanding feature is the number of orders from all parts of the country, which is indicative that the improvement in business is widespread. The attention of buyers in this district is held to some extent by auction sales of equipment and equipment placed on the market through receiverships, etc.

Word has been received here to the effect the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been awarded a contract for approximately $250,000 of machinery and electrical equipment for the Skagit river power project.

The American Can Co., bought a 60-inch open side planer for its Cincinnati plant, while the Skinner Engine Co., Erie, Pa., purchased a slotter. The Fay & Egan Co., which is moving its plant to Oakley, the former plant of the Cincinnati Trailmobile Co., is in the market for several new lathes, shapers and planers. The bulk of the equipment in the company's old plant will be offered at auction next month. The Louisville & Nashville railroad has issued a list of woodworking tools and is preparing a large list of metalworking equip-

Crane Awards and Inquiries of the Week

Orders Placed

Two cranes for the United Alloy Steel Corp., Canton, O., to the Alliance Machine Co., Alliance, O., instead of one to the Morgan Engineering Co., as reported last week.

Three 125-ton ladle cranes for new open hearth pouring building No. 1 of the Carnegie Steel Co., Duquesne, Pa., to the Alliance Machine Co., Alliance, O.

One hoist for the Pittsburgh Spring & Steel Co., Pittsburgh, to Manning, Maxwell & Moore, Inc., which likewise is understood to have closed upon a 10-ton crane.

Two cranes for an unidentified buyer in the Pittsburgh district to the Milwaukee Electric Crane & Mfg. Co., Milwaukee.

Several cranes for an unidentified buyer in the Pittsburgh district to the Pawling & Harnischfeger Co., Milwaukee.

One 5-ton electric for Link-Belt Co., Chicago; one 80-ton electric for the Belfont Iron Works, Ironton, O.; one 125-ton electric for the Detroit Edison Co., Detroit, Mich.; three 20-ton hand-power cranes for the Old Ben Coal Corp., Chicago; one 155-ton electric transfer table for the New York, New Haven & Hartford railroad, New Haven, Conn.; one 4-motor bucket crane for Sargent & Lundy, Chicago; one 20-ton electric for the Hollinger Consolidated Gold Mines, New York; one 20-ton electric for Adam Groth, Joliet, Ill.; one 25-ton electric for the Rochester Gas & Electric Co., Rochester, N. Y.; one 5-ton electric for the United States Radiator Co., Detroit, Mich.; two 10-ton electric for the Boston & Maine railroad, Boston; one 10-ton and one 30-ton electric for the Acme Steel Goods Co., Riverside, Ill.; and one 60-ton electric for the Phoenix Utilities Co., New York, to the Whiting Corp., Harvey, Ill.

Two 3-motor electric traveling cranes with 27-foot spans for the Urick Foundry Co., Erie, Pa., to the Northern Engineering Works, Detroit.

One 15-ton electric traveling crane with 40-foot span for the Reliance Coke & Foundry Co., Pittsburgh, to the Northern Engineering Works.

One 10-ton electric trolley for A. Finkle & Sons, Chicago, to the Northern Engineering Works.

One 25-ton locomtive crane for Chicago, Burlington & Quincy railroad, Galesburg, Ill., one 25-ton locomotive crane to Nash-Dowdle Co., Chicago, to the Browning Co.

Ten electric overhead cranes, ranging up to 25 tons in capacity, for the Goodman Mfg. Co., Chicago, to Pawling & Harnischfeger Co.

One 5-ton ash handling crane, 70-foot span, for the Buffalo, Rochester & Pittsburgh railroad, to an eastern builder.

One 25-ton coal handling crane for Rochester Gas & Electric Co., Rochester, N. Y., to Whiting Corp.

One 15-ton used industrial locomotive crane, 45-foot boom, for Woodward Iron Works, Mobile, Ala., to Philip T. King, 30 Church street, New York City.

One 25-ton Browning locomotive crane, 60-foot boom, for the Southern Fibre Co., Atlanta, Ga., to Philip T. King, 30 Church street, New York City.

One 20-ton Brown hoist crane, 50-foot boom, to Maymer Engineering Co., Toronto, Canada.

One locomotive crane for the John F. Casey Co., Pittsburgh, to Industrial Works.

One 200-ton wrecking crane for Norfolk & Western, to the Industrial Works.

Six 25-ton locomotive cranes for the Kopper Co., Pittsburgh, to the Industrial Works.

One 10-ton electric crane, 60-foot span; two 5-ton electric cranes, 25-foot span; three 5-ton electric cranes, 35-foot span; for the Birmingham, Ala., plant of the United States Cast Iron Pipe & Foundry Co., to the Pawling & Harnischfeger Co.

Three or four overhead cranes for the New Orleans warehouse of the Lukens Steel Co., Coatesville, Pa., to the Pawling & Harnischfeger Co.

Three electric cranes for the National Cast Iron Pipe Co., Birmingham, Ala., to the Milwaukee Electric Crane Mfg. Co.

One 5-ton electric crane, 20-foot span for the Standard Steel Works Co., Burnham, Pa., to the Milwaukee Electric Crane & Mfg. Co.

One electric overhead crane for the Superheater Co., Chicago, to the Milwaukee Electric Crane & Mfg. Co.

One 10-ton electric crane, 36-foot span, for the Ludlum Steel Co., Watervliet, N. Y., to the Cleveland Crane & Engineering Co.; 5-ton crane to be placed shortly.

One 25-ton locomotive crane, 50-foot boom, for the Browning Co.

One 270-ton locomotive hoist for the New York, New Haven & Hartford railroad, to the Whiting Corp.

One 1-ton underhung handpower crane, 15-foot span, for the Billingham Co., Kalamazoo Mich., to the New Jersey Foundry & Machine Co.

Orders Pending

One jib crane for the Bessemer & Lake Erie railroad, Pittsburgh; bids being taken.

One single 1-beam crane for the Union railroad, Pittsburgh; bids being taken.

Two 15-ton cranes, one each for Soho and Woodlawn, Pa. plants of Jones & Laughlin Steel Corp., for loading barges on the river; bids being taken.

Cranes for practically all the United States Steel Corp. units in the Pittsburgh and Youngstown territories; bids being taken and tabulated.

Several cranes for Metal & Thermit Corp. plant, San Francisco, Cal. Specifications issued by Frank I. Ellis, engineer, Pittsburgh, but purchases may be made in New York.

One 10-ton crane with grab bucket, Pittsburgh Plate Glass Co., Zanesville, O.; may postpone buying.

One small crane with grab bucket for the United Engineering & Foundry Co., Pittsburgh; bids being considered.

Two cranes for unidentified foundry interest in Pittsburgh territory, one each 10 and 15-ton; bids being taken.

One 10-ton floor controlled 3-motor crane with 39-foot 8-inch span for filtration plant in Wheeling, W. Va.; bids close April 4. J. N. Chester, Union Bank building, Pittsburgh, is engineer.

One crane for filtration plant, Toronto, O.; bids taken until April 16.

One 20 or 30-ton electric crane, with 50-foot span, for the Sullivan Granite Co., Westley, R. I., inquiry shortly to be revived; a 40-ton electric crane is contemplated for later on.

One 5-ton electric crane, 30-foot span, for the Philbrick-Booth Foundry Co., Hartford, Conn., pending.

ment which should be issued for bids shortly. The American Tool Works has received an order from an Australian user for several tools.

Tool Prices Advance Further

BOSTON, March 27.—The New England machine tool market during the week has been marked by several important advances in prices and by an unusually large auction sale of machine tools at the Watertown arsenal, Watertown, Mass. Upright drills were advanced 15 per cent by one important manufacturer. Shapers were marked up from 10 to 15 per cent, and milling machines in one case were advanced nearly 20 per cent. Close market observers are inclined to feel advances recently have been too rapid for a healthy growth of the machine tool demand throughout the year. Tool manufacturers with losses showing on their books for the past two years now are anxious to offset these as rapidly as possible while the market is active, and as a result are advancing prices more vigorously than users feel is warranted. In many lines prices now are fully back to the 1920 peak.

Some large users, feeling prices have been marked up too high, have cut down their lists to the tools which are actually needed. Nevertheless, the market is strong and while the last week has seen a falling off in the number of large buyers in New England, this has been more than offset by an increase in the number of small interests which have come into the market for one or two tools. The auction sale at Watertown is an excellent commentary on the strength of the market. From 20 to 25 dealers from points throughout the East and as far west as Chicago were in attendance, but demand from users was so strong few tools went to the dealers. Altogether approximately 150 standard machine tools were sold. Many of these have been out all winter and are still covered with snow, yet prices ranged close to 50 per cent of the new price. As an example of what happened in many cases, a 72-inch planer with a new value of about $10,000, received bids from dealers up to a little over $2000, and finally was sold to a user for $4000. A large Ohio steam shovel manufacturer was one of the heaviest buyers. Sales to this interest included a 72-inch planer, a 60-inch planer, a 54-inch planer, and a long list of lighter tools.

Higher Prices Are Being Quoted

CHICAGO, March 27.—Price advances feature the local machine tool market. Radial drills have been advanced 20 per cent, milling machines 10 per cent, Bullard boring mills 10 per cent and Hendey shapers about 16 per cent. These advances bring machine tool prices to a point equal to the highest of the war period. Dealers expect higher prices to cause a pause in buying, as many prospective purchasers have considered former prices more than they could pay. Buying of machine tools in general is moderate and for the most part confined to single tools, with buyers considering deeply before making the investment.

The International Harvester Co. continues to buy occasional pieces of equipment and is inquiring for a 3-foot radial drill and some grinders. The Illinois Central railroad is offering dealers opportunity to duplicate some of the tools bought last fall, but for the most part prices have risen and the tools can not be obtained on the same quotation. Bids on this equipment are expected to be asked later. Punch presses are selling freely in lots of two to four and makers of automotive equipment are buying many of these tools. Machine tool manufacturers appear to be filling their order books fairly well and in the case of one maker of milling machines June is the earliest delivery that can be promised. Considerable interest attaches to the sale, March 30, of the equipment of the Goddard Tool Co. at Detroit. This includes milling machines, shapers, hobbers, lathes, grinders, drill presses and miscellaneous equipment.

Volume of Orders Increases

MILWAUKEE, March 27.—The volume of March business booked by manufacturers of metalworking machinery is larger than the February total. April prospects are even better. Building costs are high and with contractors rushed by an extraordinay movement in favor of new homes, apartments and commercial buildings, industrial expansion is being held back. Another reason is the feeling of caution among manufacturers about possibilities of over-expansion. Consequently there is not a real, broad market for tools, and big business remains prospective rather than actual. The Simmons Co. at Kenosha, Wis., is buying a large quantity of new machinery for manufacturing steel furniture. The Johnson Service Co., Milwaukee, is increasing its plant 100 per cent to meet enlarged demands for automatic heat regulating systems. It now is believed the Newaygo Portland Cement Co. of Michigan, will proceed with its plan to build a branch plant at Manitowoc, Wis., at a cost of nearly $1,000,000. Wisconsin municipalities are issuing specifications for new steam and hydroelectric power plant, waterworks and other projects.

The Bulletin Board

Requests for Equipment and Supplies, Trade Literature, Etc., Made Through Iron Trade Review

RAW MATERIAL, such as black iron pipe; extra heavy ¾-inch bar steel; iron in varying widths and thicknesses; cold-rolled steel rounds, ¾-inch and other sizes; carbon steel springs; automobile casings and tubes; 30 x 3½ clincher rim wheels; special drop forgings; bolts and nuts and special U bolts are wanted by the A. B. C. Trailer Truck Co., Memphis, Tenn.

* * *

J. L. Ferguson Co., Joliet, Ill., has advised that it has purchased all necessary machinery for the present, but will add metalworking tools to its equipment from time to time. J. L. Ferguson is president.

* * *

The Thistle Foundry & Machine Co., West Graham, Va., desires to get in touch with companies which are in a position to make 1000 small rollers from cold-rolled steel, ⅝-inch x 2¼ inches, with hardened surface, for use as rollers. The Thistle company desires a quotation on 1000 pieces. J. P. Cameron is general manager.

* * *

Seamless Steel Products Co., Milwaukee, Wis., has advised that it has contracted for the erection of a building to replace one recently damaged by fire, and has purchased all necessary machinery with the exception of a few machine tools.

* * *

Pocono Iron Foundry, Allentown, Pa., advises that it is in the market for a small amount of equipment at present. Thomas W. Milnor is president.

* * *

A few machine tools, principally punch presses, will be purchased by the Ajax Auto Parts Co., Racine, Wis., for which it now is inquiring.

* * *

Paul G. Bechtner, 541 Railway Exchange building, Chicago, is in the market for machinery for an iron molding sand pit, especially apparatus for mixing and blending sands.

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

East of the Mississippi River

HOLT, ALA.—The Central Foundry Co. has let a contract to the Ingalls Iron Works Co. for a foundry building, 140 x 364 feet.

HARTFORD, CONN.—The New England Heat Treating Service Co. has been incorporated with $10,000 capital stock by Stanley P. Rockwell, Horace W. Staples, Warren D. Fuller, Bristol Conn., and Isaac D. Russell, New Britain, Conn.

WATERBURY, CONN.—Plans have been completed for the erection of a one-story, 25 x 40-foot addition, to the plant of the Connecticut Brass Foundry.

WASHINGTON—The Washington Bearings Corp. has been incorporated with $50,000 capital stock by Lonnie V. Robinson, Lewis H. and Francis O. Phelps.

JACKSONVILLE, FLA.—The Little Giant Mfg. Co., has been incorporated by Ferdinand T. Loest and G. W. Miller.

MARIANNA, FLA.—The Marianna Light & Power Co. has been incorporated with $25,000 capital stock by G. M. Thomas, F. M. Golson and others.

TAMPA, FLA.—The American Welding & Tank Co. has been incorporated with $50,000 capital stock by J. C. Beckley, Walter M. Beckley and others.

CAIRO, ILL.—The Cairo Iron & Metal Co., 1314 Commercial avenue, has been incorporated with $5000 capital stock by Charles E. Walker, Thomas Walker and Louis Levine. The company is represented by Charles B. Walker.

CHICAGO—The plant of the Johnson & Carlson Tank Works, 848 Eastman street, recently was damaged by fire.

CHICAGO—The United Coke & Coal Co., Inc., has increased its capital stock from $50,000 to $100,000.

CHICAGO—A 1-story brick and steel foundry building for a foundry will be built by A. Kinkl & Sons Co., Chicago, to be used in connection with its forging plant.

CHICAGO—C. Nielson, 709 Fulton street, is building a 1-story factory building for the manufacture of passenger and freight elevators.

CHICAGO—The Crescent Washing Machine Co., Inc., 800 North Clark street, has been incorporated with $182,790 capital stock by Herbert E. Herseles, Frank L. Holt and others.

CHICAGO.—The Alliance Steel Corp., 20 West Jackson boulevard, has been incorporated with $5000 capital stock by A. Clark, M. J. Taylor, M. C. Jensen and others. The company is represented by D. D. Delaney, 29 South LaSalle street.

CHICAGO—The Chicago Gas Appliance Co., 1440 Edison boulevard, has been incorporated with $10,000 capital stock by Clarence E. Rohrer, Edward J. Caspers and Edgar B. Elder. The company is represented by Edgar B. Elder, 72 West Adams street.

CHICAGO—The Utility Pen Co., 36 West Randolph street, has been incorporated with $25,000 capital stock to manufacture and deal in pens, etc., by E. J. Ontertag, G. T. Watson and W. R. Latcham. The company is represented by Packman, Noble & Co., 64 West Randolph street.

WAUKEGAN, ILL.—The Aerothrus Engine Mfg. Co., LaPorte, Ind., is understood to be considering establishing a plant here.

BELL, KY.—The American By-Products Coal Corp. has been incorporated with $150,000 capital stock by M. J. Moss, Pineville, Ky., S. M. Loomis and Adolph Levy, Cincinnati.

LOUISVILLE, KY.—The Ewald Spring Co., L. C. Ewald, president, has taken out a permit to erect a plant building.

LOUISVILLE, KY.—Goldner, Mackson & Co., metal workers, has been incorporated with $1000 capital stock by George F. Mackson, L. V. Goldner and George P. Goldner.

NEWPORT, KY.—The Newport Furnace Corp. has been incorporated with $100,000 capital stock by Lawrence Riedinger, A. J. Chamberlain and L. W. Scott.

NEWPORT, KY.—The Roman McLaughlin Machine Co. has been incorporated with $25,000 capital stock by John R. Roman, V. D. Roman and A. A. McLaughlin.

BALTIMORE—The Baltimore Type Foundry Co., 1 North Holiday street, has been incorporated with $450,000 capital stock by James T. Carter, Joseph L. McAllister and N. B. Kwen.

ADRIAN, MICH.—The foundry building formerly occupied by the Adrian Brass & Aluminum Co. has been purchased by Fred A. Kaiser, Detroit, who will utilize the plant as a distributing agent.

ANN ARBOR, MICH.—The Economy Boiler Co. plans a 1-story plant addition and the installation of equipment.

BRIDGMAN, MICH.—The Tirrell Mfg. Co., manufacturer of spraying equipment, plans a plant addition, to cost $45,000.

DETROIT—The Detroit Steel Corp. has been incorporated with $500,000 capital stock by W. C. Schrage, 1321 Devonshire road, Grosse Point Park; Oscar Olson, 6189 Hamilton avenue, Detroit, and Anthony Bodde, 2227 Field avenue, Detroit.

GRAND RAPIDS, MICH.—The Wolverine Carton Co. has leased a 1-story plant, 70 x 450 feet, which it will utilize as a plant.

JACKSON, MICH.—Work on the erection of a plant unit, 100 x 132 feet, for the Reynolds Spring Co. will be started in May.

MARINE CITY, MICH.—The plant of the Sidney C. McLouth Foundry Co., which was damaged by fire recently, will be rebuilt.

MUSKEGON, MICH.—The Piston Ring Co. plans the erection of a foundry building to cost about $200,000.

HATTIESBURG, MISS.—The Illumno Sign Co. has increased its capital stock from $50,000 to $100,000.

HARRISON, N. J.—Reuther Bros., manufacturers of gray iron castings, have reorganized as Reuther Foundry Co., and will expand their business to include cast iron pipe.

BROOKLYN, N. Y.—The Sheet Metal Mfg. Co. has increased its capital stock from $100,000 to $250,000.

BROOKLYN, N. Y.—The Berkshire Iron Works has been incorporated with $20,000 capital stock by F. Zenko, F. C. Spinner and J. Lipstedt. The company is represented by Attorney F. J. Knorr, Albany, N. Y.

HASTINGS-ON-HUDSON, N. Y.—The Resolute Wire Co. has been incorporated with $100,000 capital stock by J. V. McAdam K. Brower and A. F. Keen. The company is represented by Kelley, Hewitt & Harte, 41 East Forty-second street.

NEW YORK—The Elgin Electric Corp. has been incorporated with $15,000 capital stock by L. Weiseberg, E. Gettinger and others. It is represented by S. B. Lilienstein, 280 Broadway.

NEW YORK—A 2-story, 100 x 100-foot factory addition, costing $35,000, will be erected by the George Haiss Mfg. Co., 141st. street and Rider avenue, manufacture of portable conveyors.

NEW YORK—The Syracuse Fire Door Corp. has been incorporated with $20,000 capital stock by P. Goldrich, A. Saffir and A. Kalman. The company is represented by Gans, Davis & O'Neill, 299 Broadway.

NEW YORK—A $210,000, 5-story plant, will be erected at Twelfth avenue and Forty-fourth street, by the F. L. Smithe Machine Co., Eleventh avenue and Twenty-first street, manufacturer of paper and envelope machinery. The Ettinger Contracting Co., Brooklyn, is general contractor.

CLEVELAND—The plant of the L. N. & N. Foundry Co., 2088 Scranton road, recently was slightly damaged by fire.

CLEVELAND—The Standard Pressed Steel Co. has been incorporated with $500 capital stock by Frank H. Ginn, Williamson building, Grover Higgins, and others.

CLEVELAND—The Ohio Steel & Brass Co. has been incorporated with $500 capital stock by David Shaw, Joseph C. Hostetler, Union National Bank building, and others.

CLEVELAND—The Cleveland File Co. has been incorporated with $100,000 capital stock by T. A. Williams, A. A. Murfey, Clark Bole, Clinton DeWitt and J. F. Weiser.

CLEVELAND—The Welding Metals Mfg. Co. has been incorporated with $5000 capital stock by Tracy H. Duncan, J. Harold Traverse, Joseph A. Schlitz, Theodore C. Robinson and K. Wing.

CLEVELAND.—The Union Truck Body & Wagon Building Co. has been incorporated

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.25c to 3.40c
Cleveland	3.21c
Detroit	3.25c
Los Angeles	4.20c
New York	3.34c
Philadelphia	3.30c
San Francisco	3.65c
Seattle	4.00c
St. Louis	3.25c
St. Paul	3.35c

IRON BARS

Boston	3.365c
Buffalo	3.10c
Chicago	3.10c
Cincinnati	3.25c to 3.40c
Detroit	3.25c
New York	3.34c
Philadelphia	3.30c
St. Louis	3.25c

SHAPES, STRUCTURAL

Boston	3.465c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.35c to 3.50c
Cleveland	3.31c
Detroit	3.35c
Los Angeles	4.30c
New York	3.44c
Philadelphia	3.40c
San Francisco	3.75c
Seattle	4.00c
St. Louis	3.35c
St. Paul	3.45c

PLATES

Boston	3.465c
Boston 3/16-inch	3.04c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.35c to 3.50c
Cleveland	3.31c
Detroit	3.35c
Detroit, 3/16-inch	3.35c
Los Angeles	3.65c
New York	3.44c
Philadelphia	3.40c
Philadelphia, 3/16-inch	3.65c
San Francisco	3.75c
Seattle	4.25c
St. Louis	3.35c
St. Paul	3.45c

NO. 10 BLUE ANNEALED SHEETS

Boston, 3/16-inch	4.365c
Buffalo	4.20c
Chicago	4.15c
Cincinnati	4.00c
Cleveland	3.75c
Detroit	4.10c
Los Angeles	4.95c
New York	4.34c
Philadelphia	4.10c
San Francisco	4.75c
Seattle	5.10c
St. Louis	4.25c
St. Paul	4.40c

NO. 28 BLACK SHEETS

Boston	5.65c
Buffalo	5.10c
Chicago	5.00c
Cincinnati	4.75c
Cleveland	4.60c
Detroit	4.90c
Los Angeles	6.35c
New York	4.90c
Philadelphia	4.90c
San Francisco	6.05c
Seattle	6.10c
St. Louis	5.10c
St. Paul	5.25c

NO. 28 GALVANIZED SHEETS

Boston	6.65c
Buffalo	6.10c
Chicago	5.85c
Cincinnati	5.75c
Cleveland	5.75c
Detroit	5.90c
Los Angeles	7.15c
New York	5.90c
Philadelphia	6.00c
San Francisco	6.90c
Seattle	7.10c
St. Louis	6.00c

BANDS

Boston	4.35c
Buffalo	4.20c
Chicago	3.85c
Cincinnati	3.85c to 4.00c
Cleveland	4.01c
Detroit	4.05c
Los Angeles	5.10c
New York	4.14c
Philadelphia	4.10c
San Francisco	4.40c
Seattle	4.85c
St. Paul	4.10c

HOOPS

Boston	5.05c
Buffalo	4.50c
Cleveland	4.01c
Detroit	4.35c
New York	4.69c
Philadelphia, 1 inch and wider 20 gage and heavier	4.50c
Seattle	5.50c
St. Paul	4.70c

COLD ROLLED STEEL

Boston (rounds)	4.30c
Boston (shapes)	4.80c
Buffalo (rounds)	4.25c
Buffalo (shapes)	4.75c
Chicago (rounds)	4.10c
Chicago (shapes)	4.60c
Cincinnati (rounds)	4.05c
Cincinnati (shapes)	5.55c
Cleveland (rounds)	4.05c
Cleveland (shapes)	4.45c
Detroit (rounds)	4.10c
Detroit (shapes)	4.60c
Los Angeles (rounds)	5.40c
New York (rounds)	4.20c
New York (shapes)	4.70c
Philadelphia (rounds)	4.15c
Philadelphia (shapes)	4.65c
San Francisco (rounds)	5.30c
Seattle (rounds)	5.55c
St. Paul (rounds)	4.35c

with $1000 capital stock by Phillip Rosen, and Maurice Goldstein, Engineers building, and others.

CLEVELAND—The Continental Body Co. has been incorporated with $10,000 capital stock by Joseph W. Kennedy, Fidelity Mortgage building, R. L. Davis, F. H. Sellberg, G. A. Robinson and G. Carter.

GALION, O.—E. M. Freese & Co., manufacturers of brick, tile and fireproofing machinery, plans the erection of a plant extension. Lockwood, Greene & Co., Cleveland, are engineers in charge.

MARION, O.—The Marion Iron & Metal Co. has been incorporated with $10,000 capital stock by Charles F. Michael, W. E. Deerwester, Fred A. Pawsey, A. H. Gray and E. C. Crall.

NEW PHILADELPHIA, O.—The building and property of the Baines Engineering Co., Dover, O., has been purchased by A. R. Milner and Charles O. Scott of this city. The purchasers will organize a company to be known as the Milner Scott Seating Co. with a capital stock of $30,000, to manufacture opera chairs, school desks, etc.

SANDUSKY, O.—The Erie Brick & Cement Products Co. has been incorporated with $50,000 capital stock by Bert D. Smith, John A. Elliott, William A. Lockwood, F. W. Ohlomacher and G. William Doerzbach.

TROY, O.—The Troy Trailer & Wagon Export Co. has been incorporated with $10,000 capital stock by Esta L. Barnes, Hazel Hufford, Frances Hollis, E. E. Nancy and Rolla D. Hartman.

ERIE, PA.—The railroad shops of the Pennsylvania railroad here recently were damaged by fire.

ERIE, PA.—The Gloecker Mfg. Co. plans the erection of a factory building, 65 x 265 feet, to cost about $11,000.

PHILADELPHIA—Woods & Logan will start work shortly on the erection of a $55,000 factory building.

PHILADELPHIA—The Robinson Iron & Steel Co. will start work shortly on the erection of a shop building.

PHILADELPHIA—A $135,000 factory building will be erected by W. E. S. Dyer, general contractor, for the Krout & Fite Mfg. Co.

PHILADELPHIA—A general contract for a $15,000 warehouse for James Peters & Son, has been awarded to the Wm. Steele & Sons Co.

PHILADELPHIA—Contract for a $300,000 plant for Craftsow & Teitelman, has been awarded to Wm. R. Doherty. Frank E. Hahn is architect in charge.

PHILADELPHIA—Plans for the erection of a foundry have been completed by the Hinkle Foundry Co., recently incorporated with $25,000 capital. C. H. Anthony, 6300 North Eleventh street, is treasurer.

PHILADELPHIA—Contract for the erection of a $250,000 factory for Reynold Greenberg has been awarded the Wark Co. According to plans by Philip S. Tyre, architect, the proposed structure will be four stories high.

MEMPHIS, TENN.—The U. S. Wood Treating Co. has been incorporated with $200,000 capital stock by J. M. Green, T. F. Griffith and W. R. English.

GRAHAM, VA.—The Graham Furnace Corp. recently increased its capital stock to $1,000,000.

RICHMOND, VA.—The Progressive Machine Engineering Corp. has been incorporated with $15,000 capital stock by Charles E. Johnson, S. M. Hull and others. Plans of the company have not been announced.

RICHMOND, VA. — The Progressive Machine Engineering Corp. has been incorporated with $15,000 capital stock by Charles E. Johnson, S. M. Hull, W. L. Smith and C. O. Tucker.

MOUNDSVILLE, W. VA.—The Marshall-Belmont Bridge Co. has been incorporated with $25,000 capital stock by B. F. Beer, J. W. Garvin, E. E. Koontz, A. N. McConnell, and others.

APPLETON, WIS.—Being overcrowded in its present building at 652 Richmond street, the Tashank & Christensen Sheet Metal Works will erect a new factory at Locust street and College avenue to be ready July 1.

BURLINGTON, WIS.—The Burlington Commercial club will build a 2-story brick and concrete industrial building costing $25,000 as a condition of securing the plant of the Sanitary Dishwashing Co., now located at 382-386 Tenth street, Milwaukee. A shoe factory would share the building.

DELAVAN, WIS.—A 2-story garage and repair shop, 40 x 90 feet, will be built at Fourth street and Walworth avenue by the Delavan Motor Car Co.

GREEN BAY, WIS.—Sealed bids are being taken until April 2 by Ira McIntyre, secretary, board of education, for the construction of the new $500,000 east side high

(*Continued on Page 976*)

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE
BOURNE-FULLER CO.
Iron, Steel
Pig Iron
Coke

CLEVELAND

New York **Chicago** **Detroit**
San Francisco
Cincinnati

Iron and Steel Statistics

Tin Plate Production

Year	Tin plate Net tons	Terne plate Net tons	Total Net tons
1908	524,448	77,090	601,538
1909	589,929	95,465	685,394
1910	725,411	84,092	809,503
1911	798,814	79,221	878,035
1912	982,830	95,698	1,078,528
1913	854,093	68,472	922,565
1914	969,892	73,098	1,042,990
1915	1,100,913	81,735	1,182,648
1916	1,276,113	107,088	1,383,201
1917	1,616,658	76,946	1,693,604
1918	1,608,124	42,689	1,650,813
1919	1,203,579	85,427	1,289,006
1920	1,539,977	69,112	1,609,089
1921	837,660	50,721	888,381

Sheet Production

Year	
1913	1,921,001
1914	1,668,644
1915	2,106,298
1916	2,492,794
1917	2,595,606
1918	2,176,537
1919	2,316,057
1920	3,133,217
1921	1,713,288

Plate Production

Year	Sheared Gross tons	Universal Gross tons	Total Gross tons
1913	1,844,354	1,158,416	3,002,770
1914	1,346,308	766,133	2,112,441
1915	1,923,199	954,852	2,878,051
1916	2,453,150	1,224,234	3,677,384
1917	2,963,039	1,195,199	4,158,238
1918	3,885,126	1,234,782	5,119,908
1919	2,899,967	992,054	3,892,021
1920	3,505,364	1,249,769	4,755,133
1921	1,189,714	570,610	1,760,324

Shape Production

Year	Gross tons
1908	1,083,181
1909	2,275,562
1910	2,266,890
1911	1,912,367
1912	2,846,487
1913	3,004,972
1914	2,031,124
1915	2,437,003
1916	3,029,964
1917	3,110,000
1918	2,849,969
1919	2,614,036
1920	3,306,748
1921	1,272,624

Bar Production

Year	Iron Gross tons	Steel Gross tons	Total Gross tons
1908	685,233	1,301,405	1,986,638
1909	952,230	2,311,301	3,263,531
1910	1,074,163	2,711,568	3,785,731
1911	835,625	2,211,737	3,047,362
1912	944,790	2,752,324	3,697,114
1913	1,026,632	2,930,977	3,957,609
1914	563,171	1,960,460	2,523,631
1915	657,107	3,474,135	4,131,242
1916	993,948	5,236,354	6,230,302
1917	983,926	5,226,031	6,209,957
1918	846,898	5,395,851	6,242,749
1919	446,549	3,945,075	4,391,624
1920	663,032	5,467,208	6,130,240
1921	198,324	1,367,430	1,565,754

Tube Production

Year	Iron	Steel	Gross tons
1913	276,067	1,969,465	2,245,532
1914	212,147	1,525,557	1,737,704
1915	206,513	1,713,161	1,919,674
1916	278,117	2,372,941	2,651,058
1917	273,890	2,213,087	2,486,977
1918	202,958	2,087,521	2,290,479
1919	162,356	2,212,575	2,374,931
1920	199,673	2,803,052	3,002,725
1921	110,293	1,877,149	1,987,442

Steel Rail Production

Year	Gross tons
1908	1,920,944
1909	3,023,845
1910	3,635,801
1911	2,822,556
1912	3,327,915
1913	3,502,780
1914	1,945,095
1915	2,204,203
1916	2,854,518
1917	2,944,161
1918	2,540,892
1919	2,203,843
1920	2,604,116
1921	2,178,818

Iron and Steel Freight Rates

Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$1.76
Newark, N. J.	6.05
Boston	6.55
Philadelphia	5.67
Pittsburgh	1.76
Chicago	4.79
St. Louis	5.80
Minneapolis, St. Paul	6.84

Buffalo to:

Albany, N. Y.	$2.27
New England (rail)	4.91
New York and Brooklyn (rail)	4.91
Philadelphia	4.91
Rochester	1.39

Virginia furnaces to:

Philadelphia	$5.17
New England	5.92
Brooklyn, Jersey City, Newark	5.54

Birmingham, Ala., to:

Boston (rail)	$9.61
Boston (rail and water)	6.91
Cincinnati	4.05
Chicago	6.01
Cleveland	6.01
Louisville, Ky.	3.72
Minneapolis, St. Paul	8.76
New York	9.24
Jersey City, Newark	8.28
Philadelphia (rail)	7.80
Philadelphia (rail and water)	6.01
Pittsburgh	6.84
St. Louis	5.17
Seattle	20.16

Chicago to:

Des Moines	$4.26
Minneapolis, St. Paul	3.04
Milwaukee	0.76
Moline, Ill.	1.77
Omaha	5.47
St. Louis	2.16

Ironton and Jackson, O., to:

Chicago	$4.79
Cincinnati	2.27
Cleveland	3.02
Detroit	3.28
Indianapolis	2.90
Minneapolis, St. Paul	7.56

Finished Material

Pittsburgh, carloads, per 100 pounds, to:

New York	$0.34
Philadelphia	0.325
Baltimore	0.315
Boston	0.365
Buffalo	0.265
Cleveland	0.215
Cincinnati	0.295
Chicago	0.34
Detroit	0.295
Minneapolis and St. Paul	0.60
Kansas City	0.735
Denver	1.27
St. Louis	0.43
New Orleans	0.515
Birmingham	0.69
Pacific coast (all rail)	1.495
Pacific coast (tin plate)	1.20

Export Rail Rates

Manufactured Iron and Steel

Cents per 100 pounds in Carloads

From	To New York	To Baltimore	To Boston	To Philadelphia	To Pacific Coast
Pittsburgh	25.50	22.50	25.50	23.50	72.00
Wheeling	25.50	22.50	25.50	23.50	72.00
Youngstown	28.50	25.50	28.50	26.50	72.00
Chicago	42.50	39.50	42.50	40.50	50.00
Cleveland	30.00	27.00	30.00	28.00	72.00
Cincinnati	37.00	34.00	37.00	35.00	72.00
South Bethlehem	11.00	14.50	....	10.00	....

Billets

Per Gross Ton

From	To New York	To Baltimore	To Boston	To Philadelphia	To Pacific Coast
Pittsburgh	$4.30	$3.70	$4.30	$3.90	$16.13
Wheeling	4.30	3.70	4.30	3.90	16.13
Youngstown	4.70	4.10	4.70	4.30	16.13
Chicago	7.10	6.50	7.10	6.70	11.20
Cleveland	5.00	4.40	5.00	4.60	16.13
Cincinnati	6.20	5.60	6.20	5.80	16.13

Pig Iron

Per Gross Ton

From	To New York	To Baltimore	To Boston	To Philadelphia	To Pacific Coast
Pittsburgh	$4.10	$3.50	$4.10	$3.70	$14.78
Wheeling	4.10	3.50	4.10	3.70	14.78
Youngstown	4.50	3.90	4.50	4.10	14.78
Chicago	6.80	6.20	6.80	6.40	12.99
Cleveland	4.80	4.20	4.80	4.40	14.78
Cincinnati	5.90	5.30	5.90	5.50	14.78

Rails

Per Gross Ton

From	To New York	To Baltimore	To Boston	To Philadelphia	To Pacific Coast
Pittsburgh	$4.00	$3.70	$4.00	$3.80	$15.46
Youngstown	4.20	3.90	4.20	4.00	...
Chicago	6.75	6.15	6.75	6.35	11.20

Budd Stampings

When you buy THE BUDD COMPANY'S Stampings you pay for the doughnut—not for the hole. In other words, you pay only for the actual metal that is *used*—and not a cent for the scrap!

And how much does this mean to you? Just study this drawing—the large, white circle in the center represents the actual amount of material used for the stamping. The black part represents the scrap!

Figure it out yourself on paper and you will find that in this particular case the amount of scrap is almost half as great as the material that was used in the stamping. And you paid a high price for this scrap, too!

—and the *answer* is,

THE BUDD COMPANY SPECIALTY DEPARTMENT which has developed methods that reduce scrap loss to so small a percentage that it is unnecessary to include it in the reckoning.

—and in turn, the answer to *this* is *our very large and unusually efficient die department, and its skillful methods of designing dies and directing operations.*

We can and will cut your stamping costs.

Just send us samples or drawings and we shall be glad to submit an estimate to you promptly.

Let Us Cut Your Costs!

ADDRESS

SPECIALTY DEPARTMENT

EDW. G. BUDD MFG. CO.

Makers of All-Steel Automobile Bodies

PHILADELPHIA, PA.

East of the Mississippi

(*Concluded from Page 972*)

school. The architects are Foeller, Schober & Stephenson.

LANCASTER, WIS.—Schofer & Olson, Chippewa Falls, Wis., are the successful bidders at $193,000 for the erection of the Lancaster high school, which will cost about $250,000 complete and incorporate manual training shops.

MADISON, WIS.—A complete regrinding and general automobile repair shop is being installed by the Madison Tool & Stamping Works as part of its plant at 1970 Helena street.

MILWAUKEE—The Acme Chemical Co. will build a $30,000 plant, 40 x 90 feet, two stories, at Twenty-fourth and Claybourn streets. It is now leasing the building at 476 Edison avenue.

MILWAUKEE—A $30,000 garage and repair shop, 80 x 150 feet, will be built at Cambridge and North avenues by M. R. Hayes, Railway Exchange building, according to plans by Architects H. J. Esser & Sons, Camp building .

MILWAUKEE—Paul Riesen's Sons, 1280 Humboldt avenue, have been awarded the general contract to build the superstructure of the new Riverside pumping station here at a price of $434,791. The pumping equipment is being built by the Allis-Chalmers Mfg. Co. A contract for special 36 to 54-inch gate valves was let March 20 to the Kennedy Valve Co. at $14,050.

WAUPUN, WIS.—The board of water commissioners accepted the bid of the Pittsburgh-Des Moines Bridge Co. to build a steel water tank on a steel tower and erect a steel tank on the present stone tower at $10,100.

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES
Per Gross Ton Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Mesabi Bessemer, 55 per cent iron	6.20
Old Range nonbessemer, 51½ per cent iron	5.70
Mesabi nonbessemer, 51½ per cent iron	5.55

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent	10.00 to 11.00

FOREIGN IRON ORE
Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent	10.00 to 11.00
Algerian low phosphorus, 52 to 54 per cent	nominal
Swedish and Norwegian low phosphorus, 68 per cent	nominal
Swedish foundry or basic, 68 per cent	nominal
Spanish foundry or basic, 52 to 54 per cent	nominal

Manganese Ore

Prices do not include duty at rate 1 per cent per pound of metallic manganesese contained.

Brazilian, minimum 47 per cent	nominal
Indian, 48 to 50 per cent	nominal
Caucasian, 53 to 55 per cent	41 cents c.i.f. tidewater

Fluor Spar

85 and 5% grade

Washed gravel, Kentucky and Illinois mines, per ton	$21.50

Rivets

Structural rivets, Pittsburgh	3.25c to 3.50c
Boiler rivets, Pittsburgh	3.35c to 3.60c
Rivets, 7/16-in. and smaller	60 and 5 off

Nuts and Bolts

NUTS
(Up to 1¼ and 1⅛ inches inclusive)

Hot pressed square or hexagon blank	$3.25 off list
Hot pressed square or hexagon tapped	$3.00 off list
Cold punched square or hexagon blank	$3.25 off list
Cold punched, square or hexagon, tapped	$3.00 off list
Cold punched semifinished hexagon nuts ⅝-inch and larger	70-10-2½ off
Cold punched semifinished hexagon nuts 9/16-inch and smaller	70-10-5 off

Price f.o.b. Pittsburgh, Packages of 50.

CARRIAGE BOLTS
(⅜ x 6 inches, smaller and shorter)

Rolled thread	45-10 off
Cut thread	45 off
Larger and longer	45 off

MACHINE BOLTS
(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50-10 off
Cut thread	50 off
Larger and longer	50 off

(⅜ x 4 inches, cold punched nuts)

Cut thread	40-5 off
Larger and longer	40-5 off
Lag screws	50-10 off
Plow bolts Nos. 1, 2 and 3 heads	50 off
4 to 10 heads	50+20
Tap bolts	25-5 off
Bolt ends with hot pressed nuts	50 off
Bolt ends with cold punched nuts	40-5 off
Blank bolts	50 off
Rough stud bolts with nuts	40-5 off

WASHERS

Wrought washers	$5.75 off list

Steel Pipe

(Effective Feb. 1-3, 1923)

Pittsburgh basing discounts, jobbers, car-

	Butt Weld Black	Butt Weld Galvanized
⅛-inch	44 to 47	18½ to 21½
¼ and ⅜-inch	50 to 53	24½ to 27½
½-inch	55 to 58	41½ to 44½
¾-inch	59 to 62	47½ to 50½
1 to 3-inch	61 to 64	49½ to 52½
Lap Weld		
2-inch	54 to 57	42½ to 45½
2½ to 6-inch	58 to 61	46½ to 49½
7 to 8-inch	55 to 58	42½ to 45½
9 to 12-inch	54 to 57	41½ to 44½

REAMED AND DRIFTED

Butt Weld		
1 to 3-inch	59 to 62	47½ to 50½
Lap Weld		
2-inch	52 to 55	40½ to 43½
2½ to 6-inch	56 to 59	44½ to 47½

EXTRA STRONG—PLAIN ENDS

Butt Weld		
⅛-inch	40 to 43	23½ to 26½
¼ and ⅜-inch	46 to 49	29½ to 32½
½-inch	52 to 55	41½ to 44½
¾-inch	57 to 60	46½ to 49½
1 to 1½-inch	59 to 62	48½ to 51½
2 to 3-inch	60 to 63	49½ to 52½
Lap Weld		
2-inch	52 to 55	41½ to 44½
2½ to 4-inch	56 to 59	45½ to 48½
4½ to 6-inch	55 to 58	44½ to 47½
7 to 8-inch	51 to 54	38½ to 41½
9 to 12-inch	45 to 48	32½ to 35½

DOUBLE EXTRA STRONG

Butt Weld		
½-inch	41 to 44	31½ to 34½
¾ to 1½-inch	44 to 47	34½ to 37½
2 to 2½-inch	46 to 49	36½ to 39½
Lap Weld		
2-inch	40 to 43	31½ to 34½
2½ to 4-inch	42 to 45	33½ to 36½
4½ to 6-inch	41 to 44	32½ to 35½
7 to 8-inch	37 to 40	24½ to 27½

Wrought Iron Pipe

(Effective Pan. 23, 1923)

Pittsburgh basing discounts, jobbers, carloads

THREADS AND COUPLINGS

	Butt Weld Black	Butt Weld Galvanized
¼ and ⅜-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
3 to 6-inch	28	13
7 to 12-inch	26	11

PLUGGED AND REAMED
Two points less than above

EXTRA STRONG, PLAIN ENDS

Butt Weld		
¼ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2

DOUBLE EXTRA STRONG

Butt Weld		
½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	..

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL
(Effective Jan. 23, 1923)

1¾-inch	17½ off
2 and ¼-inch	20 off
2½ to 3-inch	40 off
3¼ to 4-inch	45 off

CHARCOAL IRON
(Effective Dec. 6, 1922)

1½-inch	+16
1¾-inch	+ 6
2 and 2¼-inch	4
2½ to 3-inch	9
3¼ to 4½-inch	11

SEAMLESS COLD DRAWN
(Effective Jan. 24, 1923)

1-inch	51
1¼ and 1½-inch	43
1¾-inch	27
2 and 2¼-inch	27
2½ and 2¾-inch	31
3-inch	35
3¼ to 4-inch	40
4½ and 5-inch	32

SEAMLESS HOT ROLLED

3-inch	37
3¼ to 4-inch	42

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts

Carbon, 010 to 0.20 per cent	85 off
Carbon, 0.30 to 0.40 per cent	83 off
Carbon, 0.40 to 0.50 per cent	82 off

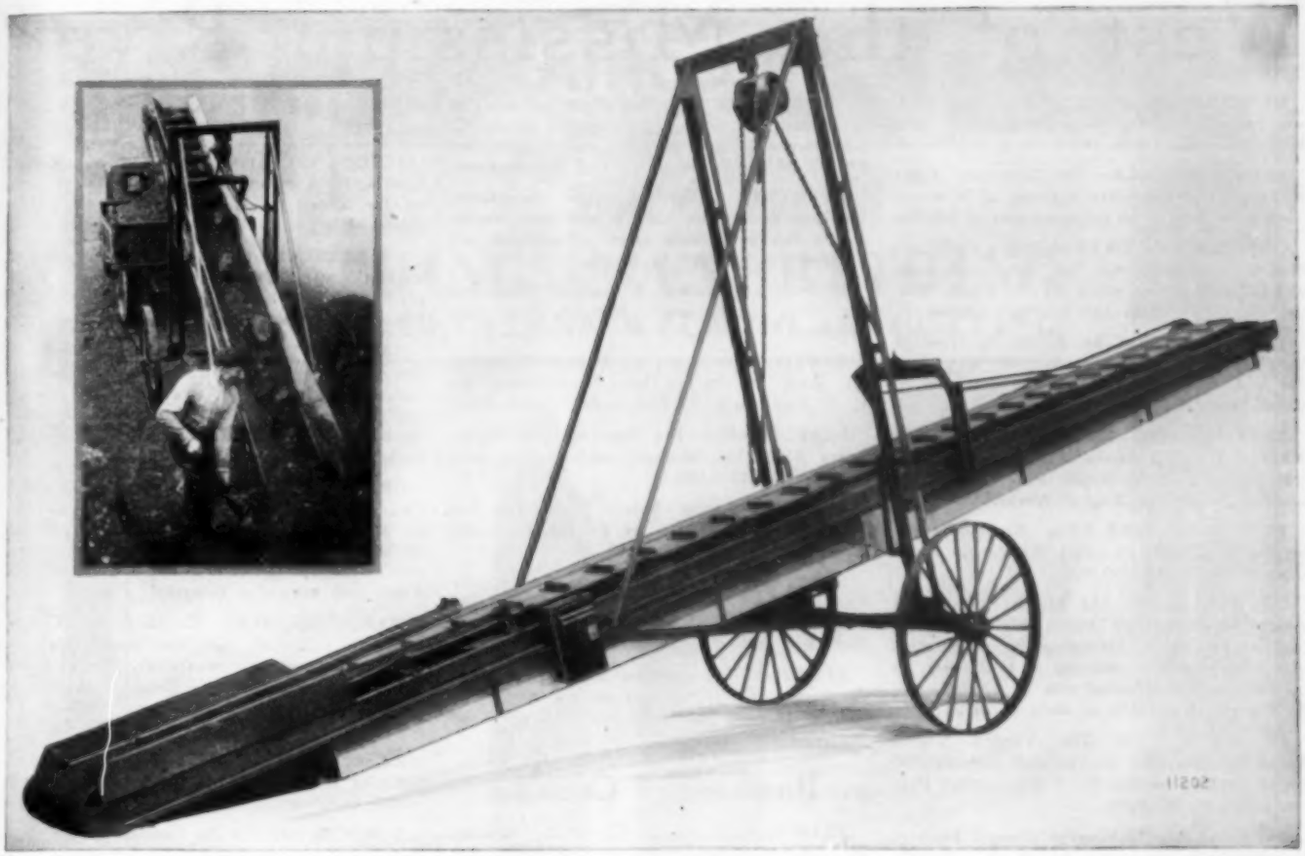
Plus differentials and extras for cutting

SEAMLESS STEEL LOCOMOTIVE AND SUPER-HEATER TUBES

Net prices per foot, f.o.b. Pittsburgh

Outside diameter	Gage	Price
2-inch	12-gage	14c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	12-gage	16c
2¼-inch	11-gage	17c
2¼-inch	10-gage	19c
3-inch	7-gage	34c
1½-inch	9-gage	13¾c
5⅜-inch	9-gage	53c
5½-inch	9-gage	55c

Plus usual extras for forming and for long lengths.



THE "CUB"—A LINK-BELT LOADER—$585.00

FEATURES

Simplicity of design.
Length of conveyor, 21 ft.
Substantial construction—weighs about twice as much as some machines of this type.
18" wide belt, giving large carrying capacity.
Belt guaranteed against cutting or fraying.
Wide loading hopper at foot of conveyor is hinged—easily and quickly opened.
Requires little power—2 H.P. motor, 2 or 3 phase, 60 cycle, A. C.

HERE'S a seven-hundred-dollar Link-Belt Portable Belt Conveyor at our new low price—$585.00, F. O. B. Philadelphia. It is one of our standard types, built to the high Link-Belt standard. It is guaranteed.

Increased production, due to our large volume of sales, has made this low price possible.

Even if you load only a small quantity of material—at intervals—can you afford to pass up an opportunity like this? Fill out and return the coupon.

1187

LINK-BELT COMPANY, NICETOWN, PHILADELPHIA, PA. Date.....

☐ We are interested in the Link-Belt "Cub" Portable Belt Conveyor. Send us further information.

☐ We handle ..... tons of ..... per ..... from..... to .....

☐ Send us the Link-Belt Portable Loader Book No. 550, showing the complete Link-Belt line of Portable Loaders.

Name ..... Firm.....

Address ..... City..... State.....

IRON TRADE REVIEW

LINK-BELT

West of the Mississippi River

HUNTINGTON PARK, CAL.—The Madsen Iron Works has been incorporated with $500,000 capital stock.

ARDMORE, OKLA.—The Consumers' Light & Power Co. plans the erection af a power plant to be built at an estimated cost of $80,000.

OKMULGEE, OKLA.—The Okmulgee Foundry & Machine Co. has been incorporated with $50,000 capital stock by T. Frank Watson, F. C. Bockman and Clarence Jeffries.

TULSA, OKLA.—The S. O. S. Tool & Supply Co. has been incorporated with $50,000 capital stock by Louis LaFlore, R. J. Rennie and M. M. Lain.

AUSTIN, TEX.—The Tips Foundry & Machine Co. has increased its capital stock from $40,000 to $120,000 and changed its name to the Tipps Engine Works.

BEAUMONT, TEX.—The Beaumont Implement Co. has increased its capital stock from $100,000 to $160,000.

DALLAS, TEX.—The Standard Spring & Axle Co., 2614 Main street, has awarded a contract to Gustave Henderson for the erection of a 1-story factory addition, 50 x 100 feet, to be built at an estimated cost of $25,000. L. K. Weaver is president of the company.

EL PASO, TEX.—The Vonde's Visible Pump Co. has been incorporated with $24,000 capital stock by E. A. Vonde, John Pullman and S. H. Palm.

FT. WORTH, TEX.—The General Foundry Co. has been organized by B. N. Wadley, T. H. Stewart and others. It will establish a plant at 607 North Main street.

SAN ANTONIO, TEX.—The Gulf States Simplex Rim Co. has been organized with $30,000 capital stock by E. M. Crane and others.

SHERMAN, TEX.—The Pattern shop at the plant of the Washington Iron Works, 318-22 East Lamar street, recently was damaged by fire. J. M. Totten is president of the company.

EVERETT, WASH.—County commissioners have decided to build a steel span bridge across the Snoqualmie river. Plans call for a structure 200 feet in length.

SEATTLE—Meacham & Babcock Shipbuilding Co., capital stock $300,000, has been reinstated.

SEATTLE—Federal Pipe & Tank Co., capital stock $75,000, has been incorporated by C. A. Paul and J. K. Parker, 1209 Smith Bldg.

SEATTLE—New Era Iron & Steel Corp., Crary Bldg., has increased capital stock from $125,000 to $175,000.

SEATTLE—Arnold Rotary Pump Co. was incorporated for $50,000 by Frank Arnold and N. O'Neill.

SEATTLE—Canyon Creek Coal & Coke Co. has been incorporated for $150,000 by J. R. Montgomery, Bert Nichols and Dewey Bullock.

SEATTLE—The plant of the Western Pipe & Steel Co. was partially destroyed by fire March 19. Replacement will be made at once.

Business in Canada

PRINCE RUPERT, B. C.—J. D. Steel and W. Travana are interested in a company that proposes to establish a foundry here to cost $25,000.

VANCOUVER, B. C.—The British Columbia Electric Power Co. will build an addition to its plant here.

FT. ALEXANDER, MAN.—The Manitoba Pulp & Paper Co. plans the erection of a plant.

ACTON, ONT.—Tenders will be called April 1, for a $15,000 manufacturing plant here for the Thompson Motor Supplies, Ltd., 415 Queen street west, Toronto, Ont.

BELLEVILLE, ONT.—The Walker Hardware Co., Ltd., has been incorporated with $75,000 capital stock by Charles C. Walker, James L. Galoway, and Charles E. Hanna.

GALT, ONT.—The Gill Plumbing Supplies, Ltd., has been incorporated to manufacture iron, steel, brass and other metal products, electrical supplies, etc., with $40,000 capital stock by Oscar E. Rosebrugh, Fred Gill, Richard M. Fraser and others.

GRIMSBY, ONT.—The Grimsby Foundry Co., Ltd., has been incorporated to carry on a general foundry business with $40,000 capital stock; by Thomas Worsley, of Hamilton, Ont.; Thomas Walker, Edward T. Adkin and others of Grimsby.

HAMILTON, ONT.—C. M. Petrie Cream Separator Co., Ltd., has been incorporated to manufacture cream separators, etc., with $1,000,000 capital stock by Hugh J. McLaughlin, William W. McLaughlin and William T. Sinclair.

HESPELER, ONT.—The Hespeler Wood Specialty Co. will build a 2-story addition and install machinery.

LONDON, ONT.—The London Iceless Refrigerator Co., recently incorporated with $100,000 capital stock, has a building here and will install equipment. W. O. Clark is mechanical superintendent.

MELBOURNE, ONT.—Campbell Bros. will build a garage and auto repair shop to cost $10,000.

Industrial Business Changes Recently Announced

THE Standard Turbine Corp., Wellsville, N. Y., which was organized some time ago to manufacture steam turbines announces the following appointments of sales representatives: Fred H. Dorner, 548 Milwaukee street, Milwaukee; Craun-Liebbing Co., 30 Euclid Arcade Annex, Cleveland; L. S. Vallaly & Co., Whitney-Central building, New Orleans; Leonard G. Paine, 806 Otis building, Philadelphia and Castle & Wilson, 1601 Arrott building, Pittsburgh.

* * *

The Youngstown Sheet & Tube Co. has removed its Pittsburgh office from 1626 Oliver building to the suite formerly occupied by the Brier Hill Steel Co., rooms 1912-1914.

* * *

The Elco Tool & Screw Corp., Rockford, Ill., has bought the plant and machinery of the Rockford Mfg. Co. H. O. Swanson is secretary of the corporation.

* * *

General offices of the Oil-Stopper Piston Ring Corp. will be moved to Muskegon, Mich., where its subsidiary plants, the Sparta Machine Co. and the Sparta Foundry Co. are located.

* * *

Abenaque Machine Works, Westminster, Vt., builder of gas and gasoline engines, has been sold to the American Service Corp., Boston, of which Edwin Adams is treasurer.

* * *

A new office in Santiago, Cuba, has been added to the worldwide chain of offices of the Westinghouse Electric International Co. The new office, which is closely allied with the Westinghouse distributors, the Cuba Electrical Supply Co., is in a building on the main thoroughfare of Santiago, Jose A. Saco, baja 11. Two well known engineers, B. Moas Jr., manager for the Westinghouse interests, and J. M. Zayas, formerly salesman for the Cuba Electrical Supply Co., at Havana, are in charge.

* * *

Stringer Bros. Co., manufacturer of valves and cast plumbing supplies at Gadsden, Ala, has removed its Chicago office from 122 South Michigan boulevard to 1100 West Thirty-eighth street.

* * *

A. H. Talbot has opened an office at 237 Railway Exchange building, Chicago, to deal in railway cars, rails and locomotives. Mr. Talbot was formerly secretary and treasurer of J. T. Gardner, Inc., Chicago.

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"Anything and Everything for Oxyacetylene Welding and Cutting"

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Manufacturer of Airco Oxygen — Airco Acetylene — Airco-Davis-Bournonville Welding and Cutting Apparatus and Supplies, Acetylene Generators, and Specially Designed Machines for Automatic Welding and Cutting — Nitrogen, Argon and other Airco Atmospheric Gas Products

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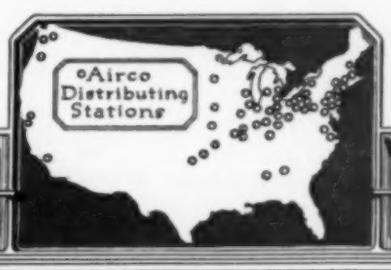

"Airco Oxygen and Acetylene Service is Good Service."

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	$17.00 to 18.00
Boston (dealers	20.00 to 20.50
Buffalo	25.25 to 25.75
Chicago	23.00 to 23.50
Cleveland	25.00 to 25.50
Cincinnati	21.50 to 22.00
Detroit (dealers)	24.00 to 24.50
Eastern Pennsylvania	25.00 to 26.00
New York (dealers)	20.50 to 21.00
Pittsburgh	27.00 to 27.50
San Francisco	14.50 to 15.00
St. Louis	23.00 to 23.50
Valleys	26.50 to 27.00
No 1 railroad steel New York (dealers)	21.75 to 22.25

BUNDLED SHEETS

Buffalo	$16.25 to 16.75
Cleveland	19.75 to 20.00
Cincinnati	17.00 to 17.50
Detroit	14.50 to 15.00
Eastern Pennsylvania	21.00 to 22.00
Pittsburgh	24.00 to 24.50
St. Louis	16.00 to 16.50
Valleys	20.50 to 21.50

STEEL RAILS, SHORT

Birmingham	$18.00 to 20.00
Boston (dealers)	20.00 to 21.00
Chicago	26.25 to 26.75
Cincinnati	25.00 to 26.00
Cleveland	24.00 to 24.25
St. Louis	24.50 to 25.00

STOVE PLATE

Birmingham	18.00 to 20.00
Boston (consumers)	20.00 to 21.00
Buffalo	20.50 to 21.00
Chicago	25.75 to 26.25
Cincinnati (net ton)	18.00 to 18.50
Cleveland	22.00 to 23.00
Detroit (net ton) (dealers)	19.00 to 19.50
Eastern Pennsylvania	21.50 to 22.50
New York (dealers)	19.00 to 19.50
Pittsburgh	20.50 to 21.00
St. Louis	22.50 to 23.00

LOW PHOSPHORUS

Buffalo	28.00 to 29.00
Cincinnati	22.00 to 23.00
Eastern Pennsylvania	30.00 to 31.00
Pitts. billet and bloom crops.	33.00 to 34.00

SHOVELING STEEL

Chicago	22.50 to 23.00
Pittsburgh	22.50 to 23.00
St. Louis	22.75 to 23.00

KNUCKLES, COUPLERS & SPRINGS

Chicago	29.00 to 29.50
Eastern Pennsylvania	28.00 to 29.00
Pittsburgh	30.00 to 30.50
St. Louis	27.50 to 28.00

COMPRESSED SHEETS

Buffalo	$22.00 to 22.50
Chicago	20.50 to 21.00
Pittsburgh	25.50 to 26.00
Cleveland	23.00 to 24.00
Detroit (dealers)	21.00 to 21.50
Valleys	21.50 to 22.00

FROGS, SWITCHES, GUARDS

Chicago	23.00 to 23.50
Eastern Pennsylvania	25.00 to 26.00
St. Louis	23.00 to 23.50

BOILER PLATE, CUT

St. Louis (dealers)	16.00 to 16.50

ANGLE BARS—STEEL

Chicago	25.50 to 26.00
St. Louis	24.50 to 25.00

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	$20.00 to 21.00
Boston (dealers)	21.00 to 22.00
Buffalo	21.00 to 21.50
Chicago, No. 1	23.75 to 24.25
Chicago, No. 2	23.50 to 24.00
Cincinnati No. 1	20.00 to 21.00
Cleveland No. 1	22.00 to 23.00
Eastern Pennsylvania, No. 1	28.00 to 29.00
Pittsburgh No. 1	25.00 to 25.50
Pittsburgh, No. 2	27.00 to 27.50
New York, No. 1 (dealers)	21.50 to 22.50
St. Louis No. 1	23.50 to 24.00
St. Louis No. 2	22.50 to 23.00

WROUGHT PIPE

Boston (dealers)	16.00 to 16.25
Buffalo	18.50 to 19.00
Eastern Pennsylvania	22.00 to 23.00
New York (dealers)	16.75 to 17.25

YARD WROUGHT

Boston	20.50 to 21.00
Eastern Pennsylvania	26.00 to 27.00

CITY WROUGHT

New York, long	$18.50 to 19.00

BUSHELING

Buffalo, No. 1	$21.50 to 22.00
Chicago No. 1	22.00 to 23.00
Chicago, No. 2	15.50 to 16.00
Cincinnati No. 1	18.50 to 19.00
Cleveland No. 1	19.25 to 19.50
Cleveland No. 2	18.00 to 18.50
Detroit, No. 1	17.00 to 17.50
Detroit No. 2 (new)	16.00 to 16.50
Detroit, No. 2 (old)	14.50 to 15.00
Eastern Pennsylvania	24.00 to 25.00
Pittsburgh, No. 1	23.50 to 24.00
St. Louis No. 1	21.00 to 21.50

MACHINE SHOP TURNINGS

Birmingham	$11.00 to 12.00
Boston (dealers)	16.50 to 17.00
Buffalo	17.50 to 18.50
Chicago	16.75 to 17.25
Cleveland	19.00 to 19.25
Cincinnati (net ton)	15.00 to 15.50
Detroit (dealers)	17.00 to 17.50
Eastern Pennsylvania	22.00 to 23.00
New York (dealers)	16.50 to 17.00
Pittsburgh	21.50 to 22.00
St. Louis	16.00 to 16.50
Valleys	19.50 to 20.00

CAST IRON BORINGS

Birmingham (chemical)	16.50 to 17.00
Birmingham, borings (plaint)	12.00 to 12.50
Boston (chemical)	20.00 to 21.00
Boston (dealers)	16.50 to 17.00
Buffalo	19.00 to 20.00
Chicago	18.00 to 18.50
Cincinnati (net ton)	16.00 to 16.50
Cleveland	20.00 to 21.00
Detroit (dealers)	17.50 to 18.00
Eastern Pennsylvania	22.00 to 23.00
Eastern Pennsylvania (chem.)	26.00 to 27.00
Pittsburgh	22.50 to 23.00
New York (dealers' price)	16.00 to 16.50
St. Louis	18.00 to 18.50
Valleys	21.00 to 21.50

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Boston (dealers)	14.00 to 14.50
Cleveland	19.25 to 19.75
Detroit (dealers)	17.00 to 17.50
Eastern Pennsylvania	21.00 to 22.00
New York (dealers)	15.50 to 16.00

IRON AXLES

Birmingham	30.00 to 31.00
Boston	27.00 to 28.00
Buffalo	24.00 to 25.00
Chicago	34.00 to 34.50
Cincinnati	30.00 to 32.00
Eastern Pennsylvania	35.00 to 38.00
New York (dealers)	29.00 to 30.00
Pittsburgh	42.00 to 43.00
St. Louis	31.50 to 32.00

IRON RAILS

Buffalo	$23.00 to 23.50
Chicago	27.00 to 27.50
Cincinnati	20.50 to 21.00
Cleveland	22.00 to 23.00
St. Louis	23.00 to 23.50

PIPES AND FLUES

Chicago	19.50 to 20.00
Cincinnati	18.50 to 19.00
Cleveland	22.00 to 22.50
St. Louis	16.00 to 16.50

RAILROAD GRATE BARS

Buffalo	$22.00 to 23.00
Chicago	24.50 to 25.00
Cleveland	22.00 to 23.00
Eastern Pennsylvania	23.00 to 23.50
New York (dealers)	19.00 to 19.50
St. Louis	23.00 to 23.50

FORGE FLASHINGS

Boston (dealers)	17.00 to 18.00
Chicago, small	19.00 to 19.50
Cleveland, small	21.00 to 22.00
Cleveland, large	21.00 to 22.00
Detroit (dealers)	18.00 to 18.50

FORGE SCRAP

Boston (dealers)	14.50 to 15.00
Chicago	23.50 to 24.00
Eastern Pennsylvania	22.00 to 23.00

ARCH BARS AND TRANSOMS

Chicago	29.50 to 30.00
St. Louis	31.00 to 31.50

ANGLE BARS—IRON

Chicago	29.50 to 30.00
St. Louis	28.50 to 29.00

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	16.00 to 17.00
Buffalo	23.00 to 24.00
Chicago	20.50 to 21.00
Cleveland	22.00 to 23.50
Eastern Pennsylvania	22.00 to 23.00
Pittsburgh	23.50 to 24.00
St. Louis	18.50 to 19.00

STEEL CAR AXLES

Birmingham	27.00 to 28.00
Boston (dealers)	27.00 to 28.00
Buffalo	24.50 to 25.50
Chicago	28.50 to 29.00
Cleveland	31.00 to 32.00
Eastern Pennsylvania	28.00 to 30.00
New York (dealers)	23.00 to 24.00
Pittsburgh	31.00 to 32.00
St. Louis	27.50 to 28.00

SHAFTING

Boston (dealers)	25.00 to 26.00
Chicago	28.50 to 29.00
Eastern Pennsylvania	28.00 to 30.00
New York (dealers)	21.50 to 22.50
St. Louis	25.50 to 26.00

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	$24.00 to 25.00
Birmingham iron	23.00 to 24.00
Boston (consumers)	24.00 to 24.50
Buffalo, iron	26.00 to 27.00
Chicago, iron	28.50 to 29.00
Cincinnati	22.50 to 23.00
Eastern Pennsylvania, cupola	27.00 to 28.00
New York iron (dealers)	23.50 to 24.00
Pittsburgh, iron	29.50 to 30.00
Pittsburgh, steel	30.50 to 31.00
St. Louis, iron	28.00 to 28.50

NO. 1 CAST SCRAP

Birmingham, cupola	24.00 to 25.00
Boston (consumers)	26.00 to 27.00
Buffalo	27.50 to 28.50
Chicago, cupola	29.00 to 29.50
Cincinnati, No. 1, machinery, cupola (net ton)	23.50 to 24.00
Cleveland, cupola	28.00 to 28.50
Detroit (net ton) (dealers)	23.00 to 24.00
Eastern Pennsylvania, cupola	28.50 to 30.00
New York, cupola (dealers)	23.00 to 23.50
Pittsburgh, cupola	29.50 to 30.00
San Francisco	26.00 to 28.00
St. Louis, agricultural	27.50 to 28.00
St. Louis, railroad	28.00 to 28.50
Valleys	23.00 to 24.00

HEAVY CAST

Boston (consumers)	25.00 to 26.00
Buffalo	21.50 to 22.00
Cleveland	21.00 to 22.00
Detroit automobile (net ton)	27.00 to 28.00
Eastern Pennsylvania	24.00 to 25.00
New York (dealers)	21.50 to 22.50
Pittsburgh	25.00 to 25.50

MALLEABLE

Boston (railroad)	25.00 to 26.00
Buffalo	27.00 to 28.50
Chicago, railroad	29.50 to 30.00
Chicago, agricultural	29.50 to 30.00
Cincinnati, agricultural	22.50 to 23.00
Cincinnati, railroad	23.50 to 24.00
Cleveland, agricultural	26.50 to 27.00
Cleveland, railroad, nominal	28.00 to 28.50
Detroit (dealers)	24.00 to 25.00
Eastern Pennsylvania, railroad	26.00 to 27.00
Pittsburgh, railroad	28.00 to 29.00
St. Louis, agricultural	27.50 to 28.00
St. Louis, railroad	27.50 to 28.00

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	24.00 to 25.00
Boston (dealers)	20.00 to 21.00
Chicago	25.00 to 25.50
Cleveland	27.00 to 28.00
Eastern Pennsylvania	26.00 to 28.00
New York (dealers)	20.50 to 21.00
Pittsburgh district	29.50 to 30.00
St. Louis	24.50 to 25.00

LOCOMOTIVE TIRES

Chicago	27.00 to 27.50
St. Louis	26.50 to 27.00

LOW PHOSPHORUS PUNCHINGS

Chicago	27.00 to 27.50
Eastern Pennsylvania	26.00 to 28.00
Pittsburgh	31.00 to 32.00